12:43:35   1   IN THE UNITED STATES DISTRICT COURT

            2   FOR THE EASTERN DISTRICT OF TEXAS

            3   MARSHALL DIVISION

            4   VOCALIFE LLC,   )(

            5   PLAINTIFF,   )(CIVIL ACTION NO.

            6   )(2:19-CV-123-JRG

            7   VS.   )(MARSHALL, TEXAS

            8   )(

            9   AMAZON.COM, INC. and   )(

           10   AMAZON.COM LLC,   )(OCTOBER 6, 2020

           11   DEFENDANTS.   )(12:47 P.M.

           12   TRANSCRIPT OF JURY TRIAL

           13   AFTERNOON SESSION

           14   BEFORE THE HONORABLE JUDGE RODNEY GILSTRAP

           15   UNITED STATES CHIEF DISTRICT JUDGE

           16

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24  (Proceedings recorded by mechanical stenography, transcript
    produced on a CAT system.)
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12:47:30   1   P R O C E E D I N G S

12:47:30   2   (Jury out.)

12:47:31   3   COURT SECURITY OFFICER: All rise.

12:47:33   4   THE COURT: Be seated, please.

12:47:34   5   Counsel, are there any matters we need to take up

12:47:43   6   before I bring back in the jury?

12:47:45   7   MS. TRUELOVE: Nothing from the Plaintiff,

12:47:47   8   Your Honor.

12:47:47   9   MR. DACUS: We have one matter, Your Honor, we

12:47:49 10   need to address with the Court, and it relates to Amazon's

12:47:53 11   Motion in Limine No. 9.

12:47:54 12   THE COURT: Go to the podium, please, Mr. Dacus.

12:47:56 13   MR. DACUS: Thank you, Your Honor. I apologize

12:47:57 14   for that.

12:47:58 15   Amazon's Motion in Limine No. 9, Your Honor,

12:48:01 16   relates to precluding Plaintiff from any reference to the

12:48:07 17   unavailability of any witnesses who does not testify.

12:48:12 18   In Mr. Baxter's examination he made reference to

12:48:14 19   the fact that no one would be here from the 2011 meeting,

12:48:19 20   and then in Mr. Fabricant's exam -- examination, he made

12:48:24 21   reference to the fact that Mr. Pance is not going to be

12:48:27 22   here.

12:48:27 23   I was not in the in-chambers meeting this morning,

12:48:33 24   but I understand that the Plaintiff is aware of this rule

12:48:36 25   because they specifically asked leave from the Court to

12:48:39   1   talk about the fact that Mr. Chhetri, whose notebook was

12:48:43   2   presented, they wanted the -- the right to say that he was

12:48:46   3   not going to be here, and the Court granted them leave to

12:48:51   4   do that, as I understand it.

12:48:53   5   But with respect to those other references, we

12:48:56   6   believe those are violations of the MIL. At a minimum, we

12:48:59   7   would ask for an instruction from the Court that they stop

12:49:01   8   that.

12:49:01   9   THE COURT: Tell me this -- tell me this,

12:49:03   10   Mr. Dacus -- and I did give Mr. Fabricant specific leave

12:49:05   11   and instructions this morning in chambers about the absence

12:49:11   12   of Mr. Chhetri as a live witness. Tell me why you believe

12:49:17   13   this objection is timely.

12:49:18   14   These -- these witnesses and these examinations

12:49:21   15   happened hour, hour and a half ago. You had an

12:49:24   16   opportunity -- your side had an opportunity to

12:49:27   17   cross-examine or to direct. Why is this not something that

12:49:31   18   you asked to approach the Court while the witnesses were on

12:49:34   19   the stand, and it would be appropriate to do something

12:49:36   20   about it, instead of waiting until they're well off the

12:49:41   21   stand, everybody's had lunch, and you've had time to come

12:49:44   22   up with this? Why is this timely?

12:49:47   23   MR. DACUS: I'd be happy to respond to it,

12:49:49   24   Your Honor. All I can respond is, for me personally, I

12:49:50   25   wanted to check over the lunch hour to make sure what the

12:49:53   1   limine said and to make sure that I did not mishear what

12:49:58   2   was said this morning.

12:49:59   3   So I certainly understand the Court's criticism

12:50:01   4   related to the timeliness. And, quite honestly, our

12:50:05   5   request is primarily that we do not have this going

12:50:08   6   forward, including in closing. So I certainly understand

12:50:10   7   the Court's criticism in that regard, and that's --

12:50:13   8   THE COURT: Well, the MIL order is one sentence.

12:50:16   9   I have a copy at my fingertips. I assume both sides have

12:50:21   10   copies at their fingertips. You have the real-time

12:50:24   11   transcript of what's been asked and answered of the

12:50:26   12   witnesses.

12:50:27   13   I find that this objection is untimely, and I'll

12:50:30   14   deny and overrule the objection on that basis.

12:50:37   15   However, that does not mean that the order in

12:50:38   16   limine is not what it is. And if there's any doubt about

12:50:41   17   where these parameters are for closing argument, I expect

12:50:44   18   to take that up and discuss it with counsel before closing

12:50:47   19   arguments are presented.

12:50:49   20   MR. DACUS: Perfect. Thank you very much,

12:50:51   21   Your Honor.

12:50:51   22   THE COURT: All right. Defendants, are you

12:50:55   23   prepared to call your next witness?

12:50:57   24   MR. HADDEN: We are, Your Honor.

12:51:00   25   THE COURT: And is this another deposition witness

12:51:02 1 or a live witness?

12:51:03 2   MR. HADDEN: No, this is a live witness,

12:51:05 3 Professor Kiaei, our technical expert.

12:51:10 4   THE COURT: All right. Let's bring in the jury,

12:51:12 5 please.

12:51:12 6   COURT SECURITY OFFICER: All rise.

12:51:13 7   (Jury in.)

12:51:39 8   THE COURT: Welcome back, ladies and gentlemen.

12:51:40 9 Please have a seat.

12:51:41 10   Defendants, call your next witness.

12:51:47 11   MR. HADDEN: Amazon calls Professor Kiaei.

12:51:51 12   THE COURT: All right. If you'll come forward,

12:51:53 13 sir, and be sworn.

12:51:57 14   (Witness sworn.)

12:52:07 15   THE COURT: Please come around, sir, have a seat

12:52:22 16 on the witness stand.

12:52:23 17   MS. DOAN: May I approach, Your Honor?

12:52:24 18   THE COURT: You may distribute binders.

12:52:42 19   All right. Counsel, you may proceed with your

12:52:51 20 direct examination of the witness.

12:52:51 21   SAYFE KIAEI, PH.D., DEFENDANTS' WITNESS, SWORN

12:52:51 22   DIRECT EXAMINATION

12:52:53 23 BY MR. LAQUER:

12:52:53 24 Q. Could you please tell us your name, sir?

12:52:55 25 A. Good afternoon. My name is Sayfe Kiaei. Sayfe is like

12:53:06 1 safety without the T, and Kiaei rhymes with Hawaii.

12:53:07 2 Q.   And where do you work?

12:53:08 3 A.   I am a professor at Arizona State University in the

12:53:14 4 Department of Electrical and Computer Engineering.

12:53:16 5 Q.   And could you tell the jury why you are here today?

12:53:20 6 A.   Yes.   I am here to give my opinion about the Amazon

12:53:30 7 Echo devices that they do not infringe on the '049 patent.

12:53:33 8 Q.   And have you prepared slides to help us here in court?

12:53:38 9 A.   Yes, sir.   I have prepared a few slides to go through

12:53:42 10 my presentation.   So, if you don't mind, let's go to the

12:53:47 11 next one.

12:53:47 12 Q.   Sure.   Would you let us know what your highest level of

12:53:51 13 education is?

12:53:52 14 A.   Yes, sir.   I received my Ph.D. from Washington State

12:53:56 15 University in 1987 at -- in the Department of Electrical

12:53:59 16 Engineering.

12:53:59 17 Q.   And prior to your current work as a professor at the

12:54:02 18 Arizona State University, where did you work?

12:54:04 19 A.   From 1993 to 2002, I was a full-time employee at

12:54:09 20 Motorola in Austin, Texas.   And at the same time also I

12:54:14 21 was an adjunct professor at University of Texas Austin.

12:54:17 22 Q.   Could you briefly summarize your experience in industry

12:54:21 23 and working on government contracts?

12:54:24 24 A.   Yes, sir.   For about 10 years, as I said, I was at

12:54:27 25 Motorola working on radios, wireless systems, audio

12:54:30   1   processing and related areas. But also over the past 35

12:54:35   2   years, I have been working on a number of research projects

12:54:39   3   and grants and development funded by the National Science

12:54:45   4   Foundations.

12:54:45   5   I have been working with Defense Advanced Research

12:54:49   6   Projects Agency, a number of projects related to audio

12:54:51   7   processing and signal processing. I've also been working

12:54:55   8   in Department of Defense and a number of other companies

12:54:58   9   throughout these years.

12:54:59   10   Q.   And has some of your work related to microphone arrays?

12:55:03   11   A.   Yes, I've had a number of projects and grants related

12:55:06   12   to that.

12:55:06   13   Q.   Can you give any examples of any of your experience

12:55:09   14   related to digital signal processors?

12:55:10   15   A.   Yes, sir. First time I got introduced to digital

12:55:17   16   signal processing, that was in 1981, I believe. I took a

12:55:19   17   class in digital signal processing. And then my master

12:55:24   18   thesis was on the development of signal processing

12:55:28   19   algorithms for noise reduction, and my Ph.D.

12:55:31   20   And then I've also been teaching classes for the

12:55:34   21   past 35 years at the universities, as well as when I was in

12:55:37   22   Motorola I taught a course within Motorola, as well, on

12:55:42   23   signal processing and digital signal processing.

12:55:42   24   Q.   So was the course specific to digital signal

12:55:45   25   processors?

12:55:45 1 A. Yes. I actually established two courses specifically

12:55:49 2 on digital signal processing. At the Arizona State

12:55:57 3 University now we have a course called EEE -- I believe

12:56:00 4 it's 404 -- that is specifically on developing digital

12:56:04 5 signal processors and processing using the Texas Instrument

12:56:07 6 TI3200. And also at UT Austin I helped them with the

12:56:12 7 development of courses in that area.

12:56:13 8 Q. Do you have experience writing and reading software

12:56:16 9 source code for audio processing?

12:56:18 10 A. Yes, sir. I've been doing that both in my Master's and

12:56:26 11 Ph.D. as well as in industry and also working on various

12:56:28 12 projects in various different languages, MATLAB, ADS, C,

12:56:35 13 C++, Perl, Lisp language, a number of other ones. Some of

12:56:41 14 them outdates me and tells my age.

12:56:44 15 Q. Are you an inventor on any patents?

12:56:46 16 A. Yes, sir. I have I think 9 or 10 patents.

12:56:50 17 Q. And have you ever done any work for Amazon before?

12:56:52 18 A. No.

12:56:53 19 Q. How much are you being paid for your time here?

12:56:55 20 A. $400.00 an hour.

12:56:57 21   THE COURT: Counsel, let me interrupt just a

12:56:59 22 minute. If both you and the witness would slow down a

12:57:01 23 little bit in your speech, that would be helpful.

12:57:04 24   MR. LAQUER: Thank you, Your Honor.

12:57:05 25   THE COURT: All right.

12:57:06   1   THE WITNESS: Thank you, Your Honor.

12:57:06   2   THE COURT: All right. Let's proceed.

12:57:08   3   MR. LAQUER: Your Honor, I offer Dr. Kiaei as an

12:57:12   4   expert in the areas of audio signal processing, microphone

12:57:15   5   arrays, audio processing, software source code, and digital

12:57:19   6   signal processors.

12:57:19   7   THE COURT: Is there objection?

12:57:20   8   MR. LAMBRIANAKOS: No objection, Your Honor.

12:57:23   9   THE COURT: All right. Then, without objection,

12:57:24   10   the Court will recognize this witness as an expert in those

12:57:27   11   designated fields.

12:57:28   12   Please continue.

12:57:31   13   Q. (By Mr. Laquer) Did you study how the Echo products in

12:57:34   14   this case work?

12:57:34   15   A. Yes, sir, I did.

12:57:38   16   Q. And have you studied how those different products are

12:57:42   17   related to each other in terms of their functionality?

12:57:46   18   A. Yes, I have. And if you don't mind, we can go to the

12:57:48   19   next slide.

12:57:49   20   And this shows the -- the various Amazon Echo

12:57:58   21   devices, and I have categorized them in two categories.

12:58:01   22   On the top, the two products you see are the

12:58:05   23   Echo 1 and Echo Dot 1, which was the Doppler. And Doppler

12:58:12   24   was a code name that they had given for the software they

12:58:15   25   used in development of those products.

12:58:18   1   And then after April of 2016, they have number of

12:58:23   2   other products that you see here, which are -- which were

12:58:28   3   also used. The software code name for them was MPAF.

12:58:31   4   Q. And what is the most important way to understand how

12:58:36   5   Echo works?

12:58:37   6   A. The most important way to understand it is to look at

12:58:41   7   the source code. I reviewed the source code for the

12:58:45   8   devices.

12:58:45   9   Q. Do slides on the Internet determine how Echo works?

12:58:51 10   A. No, they do not.

12:58:52 11   Q. Does a white paper determine how Echo works?

12:58:55 12   A. No, they do not.

12:58:57 13   Q. Why is source code so important to understanding how

12:59:00 14   the product works?

12:59:02 15   A. The source code are instructions given to the processor

12:59:08 16   that step-by-step tells the processor what to do at each

12:59:14 17   specific actions in a string.

12:59:18 18   Q. And how long did you spend reviewing the Echo source

12:59:22 19   code?

12:59:22 20   A. I spent several weeks looking at the code -- source

12:59:29 21   codes, and there are a number of different source codes and

12:59:31 22   categories, which I can explain.

12:59:33 23   Q. Can you show us how Echo's beamforming technology

12:59:38 24   works?

12:59:38 25   A. Yes, yes.

12:59:39   1   Q.   Can you explain what we see here?

12:59:43   2   A.   Yes.   What we see here is the Echo device, looking at

12:59:51   3   it from the top.   And this device that you're looking at it

01:00:03   4   from the top has six microphones around it and a microphone

01:00:05   5   in the center, as you've seen that already many times.

01:00:09   6   And then by proper combination of the microphone

01:00:12   7   signals with pre-set permanent beamforming coefficients,

01:00:19   8   you focus these microphones towards different directions

01:00:23   9   which are called the beams.

01:00:24   10   So we have beams now, for example, going to the

01:00:27   11   right and left, beams going in these different angles, as

01:00:31   12   you can see in these pictures.

01:00:32   13   Q.   If we look at the slide, there are some numbers here

01:00:35   14   from DTX-809.

01:00:38   15   Can you explain what these numbers are?

01:00:40   16   A.   These numbers are in a file called .cfg, as you can see

01:00:49   17   on the top of the -- the top part of the box.   And that

01:00:55   18   simply stands for configured files.

01:00:56   19   These are fixed numbers, fixed parameters that you

01:01:00   20   put in the microprocessor or the processor that they

01:01:06   21   determine the coefficients, they determine how many

01:01:09   22   microphone it has, determines the number of beams, and all

01:01:12   23   the things that are fixed in the system.

01:01:16   24   Q.   Are these then the coefficients of the device?

01:01:19   25   A.   These are the coefficients of the beamformer

01:01:24   1   specifically that are entered when the device is

01:01:30   2   manufactured in the factory.

01:01:32   3   Q.   We've heard some testimony that these coefficients

01:01:35   4   never change.   Is that consistent with your analysis of the

01:01:37   5   Echo source code?

01:01:38   6   A.   Yes, sir.   I have extensively looked at all of the

01:01:42   7   source codes that -- that were provided, and all of them

01:01:46   8   use the .config file, which from that it has that constant

01:01:53   9   fixed coefficients that then sets the fixed beams.

01:01:56   10   Q.   And are those coefficients also called the weights?

01:02:03   11   A.   Yes.   There are a number of terms.   We call them

01:02:05   12   technical -- we call them weights because they weight the

01:02:09   13   microphone combinations or coefficients and et cetera.

01:02:13   14   Q.   Do Echo's beams ever move?

01:02:16   15   A.   Echo beams do not move.

01:02:17   16   Q.   Do Echo's beams ever grow?

01:02:19   17   A.   Echo beams do not grow.

01:02:22   18   Q.   Does Echo wait until it receives sound before it

01:02:26   19   creates a beam?

01:02:27   20   A.   No, it does not.   As a matter of fact, when Echo is

01:02:34   21   shipped from the factory in the box, already has the

01:02:37   22   weights -- excuse me -- already has the weights loaded on

01:02:42   23   the processors.

01:02:43   24   And then as soon as you bring it home and plug it

01:02:48   25   in, when it turns on, those arrays are fixed, and they're

01:02:52   1   pointing specifically at the directions in the example I'm

01:02:55   2   showing on my slide.

01:02:59   3   Q.   Does this file shown here, DTX-809, show when these

01:03:06   4   coefficients were created? And I know some of the text is

01:03:10   5   small.

01:03:10   6   A.   Oh, yes, I see that. If you see -- I'm not very good

01:03:17   7   at using this system here, but if you look at the first

01:03:19   8   line on top, it says: On November 27th, 2017, from Knight

01:03:29   9   AFE -- Knight is the product name, and AFE is the analog

01:03:34 10   content.

01:03:34 11   Q.   And that was before the '049 patent in this case ever

01:03:37 12   existed when it came on September of 2018, correct?

01:03:40 13   A.   Yes, sir.

01:03:45 14   Q.   How were these beamformer coefficients created?

01:03:48 15   A.   These are created in advance by the engineers of Amazon

01:03:56 16   prior to shipping the devices.

01:03:57 17   Q.   Were these created on an Echo?

01:03:59 18   A.   They were not created on Echo.

01:04:01 19   Q.   Could you explain where they were created?

01:04:04 20   A.   Yes. These were created, as I said, in -- in advance

01:04:12 21   by the Amazon engineers using software called MATLAB that

01:04:17 22   simply simulates an environment.

01:04:19 23   Q.   Does Echo form one beam at a time or all of its beams

01:04:24 24   at the same time?

01:04:24 25   A.   Depending on the configuration that is also identified

01:04:29   1   in this config file, and the picture you see here, this one

01:04:33   2   has six beams. And all of the six beams are simultaneously

01:04:37   3   turned on as soon as the device is plugged in, and those

01:04:41   4   beams are fixed. They do not change direction.

01:04:44   5   Q.   Can you show us how that works?

01:04:46   6   A.   Yes, if you can go to the next slide.

01:04:54   7   So what we see here is that on the top left are

01:04:58   8   the seven microphones.

01:05:00   9   Q.   And what are those microphones having a red line going

01:05:04 10   into?

01:05:05 11   A.   So all the seven microphones that were sitting on the

01:05:09 12   circle on top of the Echo, they go to a box called fixed

01:05:14 13   beamformer, which is the software running performing fixed

01:05:17 14   beamforming.

01:05:17 15   Q.   And does that happen even before someone speaks to the

01:05:22 16   Echo, or does it occur after that?

01:05:24 17   A.   That happens as soon as you turn on the device.

01:05:28 18   Immediately after you turn on the device, then the

01:05:30 19   microphone signals are captured, and they go to this --

01:05:33 20   this box in software, which is called the fixed beamformer.

01:05:36 21   Q.   And in this picture, is the woman speaking to the Echo?

01:05:41 22   A.   No. In this picture does not, and it's only the

01:05:46 23   background noise.

01:05:47 24   Q.   Can you explain what those blue lines are at the top of

01:05:51 25   the -- sort of cell phone looking bars on them?

01:05:53   1   A.   Yes, this -- I hope you like my artwork.

01:05:57   2   What I did is I put in a little cell phone signal,

01:06:00   3   which indicates the -- the signal -- the audio signal, for

01:06:08   4   example, strength in each one of the output of the arrays,

01:06:11   5   not the output of microphones, at the output of the fixed

01:06:14   6   beamformer are the arrays coming out, the beams.

01:06:17   7   So it's showing the strength of each one of the

01:06:21   8   beams.   And as you can see, when there is no signal, nobody

01:06:24   9   talking in the room, all of those are in the one bar or

01:06:28 10   very small bar.

01:06:29 11   Q.   Can you show us what happens when she speaks?

01:06:32 12   A.   Yes.   If you can go to the next slide.

01:06:35 13   What I did was a little animation here.   What I'd

01:06:38 14   like to do is -- is point out -- your attention to how the

01:06:46 15   different beams' strength are shown around the circle of --

01:06:51 16   I apologize --around the circle -- on the -- on the beams.

01:06:53 17   So on top, the top bar has only two bars.   And

01:06:55 18   that's the beam that is pointing towards the 1:00 o'clock.

01:06:58 19   And then the beam that's pointing towards 3:00 o'clock,

01:07:01 20   that only has one bar which corresponds to exactly what

01:07:05 21   shows the signal on that specific beam.

01:07:07 22   And then coming down around 5:00 o'clock, you see

01:07:10 23   the one that has two bars.   And then as we're getting

01:07:13 24   closer to the speaker, the bar that is around the 7:00

01:07:16 25   o'clock, that is -- has four bars.

01:07:18   1   And then the beam that is pointing towards the

01:07:25   2   speaker that says Alexa -- "Alexa," that one has four bars.

01:07:31   3   And then the one around 11:00 o'clock has three bars.

01:07:35   4   So those are corresponding to the output of the

01:07:38   5   fixed beamformer. So that's number one, two, three, four,

01:07:41   6   five, six -- six beams formed. Each beam has a strength

01:07:46   7   based on the amount of signal that is receiving, and the

01:07:50   8   signal strength is shown there.

01:07:51   9   Q. And is it true that in some cases the strongest beam is

01:07:55   10   not the one pointed at the speaker?

01:07:57   11   A. It is possible, yes. There are some areas by which

01:08:00   12   you're in a room that your sound may be bouncing off the

01:08:04   13   wall, and the -- some of the beams on the other side may be

01:08:07   14   getting the sound or maybe there's another sound out there

01:08:10   15   that may be doing that. So not necessarily all of them are

01:08:14   16   the same way.

01:08:15   17   Q. What is the box at the top right that says beam

01:08:18   18   selector?

01:08:18   19   A. So the beam selector, which is also implemented in the

01:08:22   20   source code, what it does is that it's looking at the

01:08:25   21   output of all of these arrays simultaneously. It's looking

01:08:31   22   at all of them simultaneously and is comparing the signal

01:08:35   23   in all of them.

01:08:36   24   Technically speaking, it's looking at what you

01:08:40   25   call signal-to-noise ratio, but really is looking at the

01:08:44 1 signal strength. And then among them, it selects the one

01:08:47 2 with the strongest signal.

01:08:49 3   And as you can see here, the one that is pointing

01:08:52 4 at 9:00 o'clock, which is the Beam No. 5, is the one that's

01:08:56 5 selected.

01:08:56 6 Q. After the beam selector selects the strongest beam, do

01:09:01 7 the other beams go away?

01:09:02 8 A. No. As long as Alexa -- sorry, not Alexa. I

01:09:08 9 apologize. Strike that.

01:09:09 10   As long as the Echo device is on, it's continually

01:09:12 11 generating these beams all the time, and they are fixed in

01:09:15 12 that fixed direction. They're always pointing, in this

01:09:17 13 example, in this direction. So if the speaker doesn't

01:09:20 14 speak, they're still on.

01:09:22 15 Q. Did you hear some testimony about a light ring on the

01:09:25 16 Echo device?

01:09:27 17 A. Yes, sir, I did.

01:09:28 18 Q. Can you explain how the light ring relates to what we

01:09:32 19 see here?

01:09:32 20 A. The light ring is -- is LED -- the LED. And that LED

01:09:41 21 simply shows which one of the beams have been selected to

01:09:46 22 the output. In this case, as you see in this example, the

01:09:51 23 beam that is at 9:00 o'clock pointing towards the speaker,

01:09:55 24 is the one that's going to turn on.

01:09:57 25 Q. But Echo still has beams on other locations where there

01:10:01   1   is not a light on the light ring; is that correct?

01:10:03   2   A.   Yes.   All the beams are on.   All the beams are

01:10:07   3   operating.   Only the beam that has the strongest signal is

01:10:11   4   the one that turns on -- the LED turns on.   The LED is

01:10:16   5   simply an indication of which beam's turned on.

01:10:19   6   Q.   Did you hear Mr. Prasad's testimony about Echo sending

01:10:24   7   audio data into the Alexa Cloud?

01:10:27   8   A.   Yes, sir, I did.

01:10:28   9   Q.   Can you explain how that relates to what we see on this

01:10:32   10   picture here?

01:10:33   11   A.   So once the beam is selected, that is the beam that's

01:10:40   12   going to go out, there may be additional processing.   And

01:10:43   13   then that beam is the final beam that is sent out to the

01:10:47   14   Alexa Cloud.

01:10:50   15   And the Alexa Cloud, which is through the

01:10:54   16   Internet, accessing this massive computing in the Alexa

01:10:59   17   servers, that then captures whatever you said and processes

01:11:07   18   that and does all the different descriptions that Mr. Rohit

01:11:12   19   described this morning, as well as Mr. Phil described this

01:11:15   20   morning.

01:11:15   21   Q.   And what happens when the lady that we see in the

01:11:18   22   picture here moves while speaking to the Echo?

01:11:20   23   A.   I may -- I think I have -- I'm showing the signal on

01:11:25   24   that.

01:11:26   25   So right now we're on 1:00 o'clock, which is the

01:11:29   1   person said, "Alexa." And Alexa recognized. And let's say

01:11:32   2   now they're walking around, and they say: Alexa, what is

01:11:37   3   the population of Texas?

01:11:41   4   Q. Well, can you explain to us first what those numbers

01:11:44   5   are in the top left so we can keep an eye on those?

01:11:47   6   A. Yes, absolutely.

01:11:49   7   Q. What are those?

01:11:50   8   A. Thank you, sir. So those numbers correspond to the

01:11:53   9   coefficients of the weights that I was talking about.

01:11:55 10   These are the fixed coefficients. These are fixed weights

01:11:59 11   that were developed by the -- by the design engineers in

01:12:03 12   Amazon before the device was shipped.

01:12:06 13   And these simply correspond how the different

01:12:08 14   microphone signals are combined to form these beams. And

01:12:12 15   they do not change.

01:12:12 16   Q. And why is there a purple line around one of the six

01:12:16 17   beams?

01:12:16 18   A. So if you think about the last slide I had for a

01:12:22 19   second, among these six beams, the one, No. 1, had the

01:12:26 20   highest signal. And the beam selector said No. 1 has the

01:12:30 21   highest signal, let's pick that. And that signifies the

01:12:34 22   fact that the No. 1 has the highest signal.

01:12:36 23   Q. Let's see what happens when she moves.

01:12:38 24   A. Yes, thank you.

01:12:40 25   So she -- she says, "Alexa," and now she's moving

01:12:44 1   and saying "what is the population of Texas" as she's

01:12:47 2   walking around the room. And as you can see now, as she's

01:12:50 3   walking around the room, she's getting closer to speaker --

01:12:53 4   sorry, not to the speaker -- to the Array No. 2, and then

01:12:56 5   to the Beam No. 3.

01:12:57 6   And as she's walking around, that Beam No. 2 has a

01:13:01 7   higher signal. Then the Beam No. 3 is going to get the

01:13:04 8   higher signal. And she stops there, and that indicates

01:13:07 9   that Beam No. 3 is the one with the highest, technically

01:13:11 10 speaking, signal-to-noise ratio or the highest signal

01:13:15 11 level.

01:13:15 12 Q.   Why didn't the numbers change?

01:13:17 13 A.   The coefficient numbers you mean?

01:13:22 14 Q.   Yes.

01:13:23 15 A.   Oh, okay. I thought you were talking -- the

01:13:25 16 coefficient numbers don't change because we are not

01:13:27 17 changing the beams. The beams are constant. What

01:13:30 18 determines the beam's shape and directions are those

01:13:32 19 coefficients.

01:13:33 20   If those coefficients were -- were designed and

01:13:37 21 uploaded in the system during the manufacturing by the

01:13:42 22 designers -- before manufacturing the devices and they were

01:13:44 23 uploaded and shipped, they exactly stay the same. Nothing

01:13:48 24 changes. The coefficients do not change.

01:13:49 25 Q.   How do you know that Echo works in that way you just

01:13:55   1   described?

01:13:55   2   A.   I have studied the source code extensively, and I have

01:13:58   3   looked at a number of different files that describe the

01:14:01   4   different stages of the design and different -- different

01:14:05   5   software that are involved in the development of the Echo.

01:14:10   6   Q.   Can you explain what we see on this slide?

01:14:12   7   A.   Yes, sir.   What this -- I'm going to categorize the

01:14:16   8   files that associate with what Echo has.   There are

01:14:20   9   hundreds of files in there.

01:14:22   10   The first category is called MATLAB files.   MATLAB

01:14:26   11   files perform mathematical simulation.   It's like

01:14:30   12   calculators were fancier -- it's much more -- it's files

01:14:33   13   that they have -- they're performing simulations, and they

01:14:36   14   are not on the device.   These are done in the lab at the

01:14:44   15   Amazon -- by the Amazon engineers.   They have nothing to do

01:14:47   16   with the actual device.

01:14:48   17   So in here right now I have a couple of the files

01:14:52   18   highlighted on top that associate with the beamformation --

01:14:57   19   associate with the -- the beam coefficient of the beam

01:15:01   20   weights formations.

01:15:02   21   Q.   Let's look at the next slide.   What are configuration

01:15:06   22   files?

01:15:06   23   A.   The config files, or the configuration files, as I

01:15:09   24   said, these are the files that have the constant numbers in

01:15:12   25   them.   They have a bunch of numbers in them that these

01:15:17   1   numbers signify how many microphones the device has.

01:15:22   2   For example, the top one is Biscuit. So if you

01:15:25   3   look over in the middle of the top line, it says

01:15:30   4   BiscuitAudioFrontEnd/config/AFE.cfg.

01:15:34   5   So what this is telling me is that it's a Biscuit

01:15:37   6   product. It is an audio front end Biscuit config files.

01:15:41   7   So it has a number of parameters that are fixed. And these

01:15:45   8   parameters are in a file called AFE.cfg -- AFE.config.

01:15:53   9   I'm going to go and look at that and see what's

01:15:56 10   inside of that and that tells me how many microphones it

01:16:00 11   has, how many beams it has, the number of parameters, what

01:16:02 12   are the coefficients for that, and I would know, huh, what

01:16:06 13   config file is doing this, what is this.

01:16:06 14   Q.   What is the Biscuit?

01:16:07 15   A.   Biscuit is one of the Echo products. They all have

01:16:16 16   different names, Biscuit, Crumpet, Donuts, and so on.

01:16:22 17   Engineers have a creative way of naming products.

01:16:25 18   Q.   All right. And can you explain what these file are we

01:16:26 19   see on this next slide?

01:16:28 20   A.   The next files are Echo source code. These are the

01:16:33 21   actual files that run on the -- on the devices. These --

01:16:36 22   these are done in real-time. They are -- these files are

01:16:45 23   written in C++.

01:16:46 24   And as you can see on the first line, all the way

01:16:49 25   down, it says cpp, and C++ is simply a language -- the C

01:16:54 1 language that we write codes in for real-time operations of

01:16:57 2 the system. And it's -- that one is associated with

01:17:00 3 audioFrontEnd.cpp.

01:17:01 4   And then below that, I have another file called

01:17:05 5 audioFrontEnd.h. That is a header file. And that header

01:17:09 6 file is simply saying what are the different, common

01:17:12 7 variables and common routines and common things between

01:17:16 8 these different files.

01:17:20 9 Q. And are these all amongst the source code files that

01:17:22 10 you reviewed as part of your work in this case?

01:17:25 11 A. Yes, sir.

01:17:26 12 Q. Can you explain what the '049's method of beamforming

01:17:33 13 does?

01:17:33 14 A. Yes. '049 patent, and you've seen that for the past

01:17:39 15 few days in many, many different details and so on. But I

01:17:43 16 want to, at a high level, what the '049 patent does is it

01:17:47 17 describes a series of very specific steps and the specific

01:17:50 18 things it has to do in order to perform adaptive

01:17:56 19 beamforming.

01:17:56 20 Q. Let's look at Claim 1 of the '049 patent.

01:17:59 21   What is the importance of the patent claim as part

01:18:04 22 of your analysis in this case?

01:18:06 23 A. Yes. As His Honor also mentioned at the beginning, as

01:18:16 24 well as a number of what the speakers talked about, the

01:18:18 25 value of the patent, what defines exactly what the patent

01:18:21   1   does is based on the claims. So the claim is the most

01:18:25   2   important part of the patent. That's what we always study.

01:18:29   3   So in this case, this claim tells us what the

01:18:33   4   patent defines.

01:18:35   5   Q.   How would you describe Claim 1?

01:18:36   6   A.   I had to study Claim 1 for a while, and it's a very --

01:18:47   7   as you can see, it has a number of -- several, several

01:18:50   8   steps in here. And you have to go through that to

01:18:53   9   understand the different steps.

01:18:55 10   So as you can see, it is -- and I've broken it up

01:19:01 11   in terms of number of substeps to help go through that.

01:19:04 12   Q.   Okay. Did you apply the Court's claim constructions in

01:19:09 13   analyzing Claim 1 here?

01:19:10 14   A.   Absolutely, yes, sir.

01:19:13 15   Q.   Did you consider the prosecution history of the '049

01:19:15 16   patent, that is DTX-54, in forming your opinions for this

01:19:19 17   case?

01:19:20 18   A.   Yes, sir, I did.

01:19:21 19   Q.   Did you consider the prosecution history of the '756

01:19:25 20   patent, that is DTX-55, in forming your opinions in this

01:19:29 21   case?

01:19:29 22   A.   Yes, sir, I did.

01:19:31 23   Q.   Looking at the first claim here, can you explain how

01:19:38 24   the claim is organized?

01:19:40 25   A.   Yes. As I said, I think you've heard this already

01:19:47 1 multiple times, but the claim discusses a number of steps

01:19:51 2 in here, and I have numbered those steps, and each step has

01:19:58 3 a specific things that it's asking for.

01:20:00 4 Q.   In some of the formatting that we see on the slide, is

01:20:04 5 a little different than the spacing of how the words in the

01:20:06 6 claim appear in the back of the patent itself. Can you

01:20:09 7 explain that?

01:20:09 8 A.   Yes. I -- I -- I changed the formatting a little bit

01:20:14 9 so that it's a bit easier to read, and I can explain it

01:20:18 10 better. Otherwise, we'll have one column that we have to

01:20:20 11 go through, and it makes it a little bit --

01:20:23 12 Q.   In other words, it's all still the same?

01:20:28 13 A.   Absolutely the same exact content.

01:20:29 14 Q.   And is there any step in this claim that you'd like to

01:20:34 15 talk about first to explain the claim?

01:20:36 16 A.   So what I'd like to do is that, given that we've heard

01:20:40 17 the patent a few times, I'd like to go through very

01:20:44 18 specific and important things that are described in this

01:20:47 19 patent that, in my opinion, the Echo devices do not

01:20:57 20 infringe.

01:20:57 21   So let's go through Step [C], if you don't mind,

01:21:03 22 determining a delay.

01:21:06 23 Q.   Can you explain what we see here?

01:21:08 24 A.   Yes. This is Step [C], which I call it [C], has a

01:21:12 25 number of substeps in there. And this step has to do with

01:21:17 1 determining a delay.

01:21:19 2 Q.   And could you tell the jury what we see on the right

01:21:21 3 side of this slide?

01:21:23 4 A.   Yes.   The right side is a graphical representation that

01:21:28 5 is from the '049 patent, Figure 5, that describes --

01:21:32 6 illustrates how -- what is this delay and what is the

01:21:37 7 determination of the delay involved.

01:21:39 8 Q.   And what is highlighted in yellow right now?

01:21:41 9 A.   That's highlighted "determining a delay," and the

01:21:46 10 determining a delay -- the delay is the delay for the

01:21:50 11 microphone.

01:21:51 12   For example, as you can see in the right, we have

01:21:57 13 four microphones, microphone M_1, microphone M_2, microphone

01:22:11 14 M_3 and microphone M_4 -- sorry, from 0 -- microphone M_0 and

01:22:10 15 $_1$ and $_2$ and $_3$.   And the delay associated with the delay that

01:22:14 16 it takes for the sound from microphone M_3 to the origin of

01:22:17 17 the --

01:22:17 18 Q.   So is there a different delay for each of those

01:22:21 19 microphones?

01:22:21 20 A.   Yes.   We have tau_3 associated with a delay, according

01:22:26 21 to the microphone 3, and then tau_1 the delay associated

01:22:30 22 with the microphone 1.   Because as the sound propagates,

01:22:33 23 the sound is going to hit the different microphones at

01:22:36 24 different times.

01:22:36 25 Q.   There are a lot of words after the phrase "determining

01:22:39   1   a delay."   Could you explain what that means?

01:22:42   2   A.   Yes.   What this requires is a number of specific steps

01:22:51   3   that one has to go through in order -- that -- that the

01:22:58   4   patent requires.

01:22:58   5   So this patent -- this claim, this specific claim

01:23:03   6   requires that -- all of these different steps.

01:23:07   7   Q.   And can you explain what's shown in highlighted colors

01:23:10   8   here?

01:23:10   9   A.   Yes.   The highlighted colors correspond to what is in

01:23:18   10   the claim language and what the claim requires.   And I

01:23:20   11   highlighted it on the right to show that -- to find the

01:23:25   12   delay, what are the different parameters that we need --

01:23:28   13   that the claim requires to -- to calculate or to determine.

01:23:31   14   Q.   So if a product is missing just one of these colored

01:23:37   15   items, then is using the product infringement?

01:23:39   16   A.   The product is using -- missing any of these, it does

01:23:44   17   not infringe.

01:23:45   18   Q.   How would you determine whether or not a product has

01:23:48   19   each of these items shown highlighted here?

01:23:50   20   A.   You have to look at the source code and see exactly how

01:23:54   21   the product is working and see if it is doing and

01:23:58   22   performing these steps or not.

01:24:03   23   Q.   And based on your review of the Echo source code, does

01:24:07   24   Echo perform these steps?

01:24:08   25   A.   Echo does not perform any of these steps in here.

01:24:11 1   Q.   Do you recall Mr. McAlexander identifying any delay in

01:24:17 2   any source code of any Echo device that would satisfy this

01:24:22 3   claim language?

01:24:22 4   A.   No, sir, I do not see that.

01:24:27 5   Q.   Could you explain why the patent has this step for

01:24:30 6   determining a delay?

01:24:32 7   A.   Yes, sir. Determining a delay, at a high level, it --

01:24:40 8   if that delay, in terms of when the sound wave coming in,

01:24:46 9   it hits different microphones at different times, that

01:24:49 10 delay is used to form the beams.

01:24:51 11   That is very important, because then you can form

01:24:54 12 the beams in a specific direction that you want to do that.

01:24:58 13 So you need to know the delay in terms of when the sound is

01:25:02 14 coming and when it hits the different microphones.

01:25:05 15 Q.   And are you describing the method that is required by

01:25:08 16 the patent?

01:25:09 17 A.   Absolutely, yes, that's what the patent requires. Yes.

01:25:12 18 Q.   Does Echo perform determinations to make a beam after

01:25:17 19 it receives sound?

01:25:19 20 A.   Echo does not calculate any delays, and all of the Echo

01:25:28 21 beams are determined before even Echo was shipped by the

01:25:35 22 designers at Amazon. When Echo is shipped, the beams are

01:25:39 23 already formed, the beam coefficients are already

01:25:42 24 determined. And when you plug it in, the beams are formed.

01:25:45 25 Q.   What is the table in the lower right side of this

01:25:49   1   slide?

01:25:49   2   A.   The table on the lower side is a calculation of how you

01:25:58   3   find the delay for different microphones.

01:26:04   4   Q.   Is there any other reason why the steps or the parts of

01:26:10   5   the determining a delay requirement are different than how

01:26:14   6   Echo works?

01:26:16   7   A.   Yes.

01:26:23   8   Q.   Can you explain what's highlighted?

01:26:25   9   A.   Yes.   As -- as you can see in No. 4, the delay has to

01:26:32   10   be represented in terms of number of samples, in terms of a

01:26:36   11   number, which is a number of samples of -- of that delay.

01:26:41   12   Q.   And what does the next step describe?

01:26:44   13   A.   The next step is going to be describing, as the person

01:26:49   14   is talking, how the waves are going to be doing that.   So

01:26:52   15   this next step is discussing the determination of the delay

01:26:56   16   enables beamforming.

01:26:57   17   So what we're doing here -- what -- what the

01:27:00   18   patent requires is that once you determine the delay, based

01:27:03   19   on these angles that we've been talking about, then after

01:27:10   20   the delay is determined based on number of samples, then

01:27:13   21   that enables the beamforming, then you form the beams.

01:27:16   22   Q.   Can you show that?

01:27:18   23   A.   Yes.   If you don't mind, let's go to the next slide.

01:27:21   24   So as we can see here, after -- after the speaker

01:27:29   25   speaks, the delay is determined.   Once the delay is

01:27:35	1	determined, after that, then the beam is formed.
01:27:42	2	Q. Does Echo perform the determining a delay step required
01:27:46	3	by Claim 1?
01:27:47	4	A. No, sir, it does not.
01:27:49	5	Q. Is there any other step here that you'd like to discuss
01:27:52	6	next?
01:27:52	7	A. Yes. Next go to the next step, if you don't mind, next
01:27:57	8	slide.
01:27:58	9	So this one is an Element [E], which is
01:28:06	10	beamforming adaptive -- performing adaptive beamforming.
01:28:09	11	Q. And did you use the Court's construction of the claim
01:28:14	12	term "adaptive beamforming" in forming your opinions here?
01:28:16	13	A. Yes, sir, I did.
01:28:18	14	Q. Can you explain what that construction tells us?
01:28:28	15	A. What this construction says that -- adaptive
01:28:32	16	beamforming is a beamforming process where the directivity
01:28:36	17	pattern of the microphone array is capable of being
01:28:40	18	adaptively steered in the direction of the -- of a target
01:28:48	19	sound signal emitted by a target sound source in motion.
01:28:52	20	Q. What is a directivity pattern?
01:28:53	21	A. Directivity pattern is the direction that the pattern
01:28:59	22	is -- is pointing at, the pattern is going at.
01:29:02	23	Q. Is that related to a beam?
01:29:04	24	A. Yes.
01:29:04	25	Q. Can you explain how?

01:29:05   1   A.   By -- by getting the coefficients from the -- from

01:29:13   2   getting the delay and the coefficients, and the

01:29:15   3   coefficients -- or the weights determine the directivity

01:29:19   4   pattern of the beam.

01:29:20   5   Q.   And so is the directivity pattern the beam?

01:29:23   6   A.   Yes.

01:29:24   7   Q.   And so we've heard a lot about different types of

01:29:30   8   adaptive beamforming. Can you tell us what type of

01:29:32   9   adaptive beamforming this patent claim requires, based on

01:29:36   10   the language we see here?

01:29:39   11   A.   Yes. I'll try to give a high-level description of what

01:29:43   12   this is.

01:29:43   13   So this is a -- a beamforming process that the

01:29:51   14   directivity pattern of the microphone, once you form the

01:29:53   15   beam, the direct direction that's going, is capable -- it

01:29:58   16   has the ability to, of being adaptively steered. So you

01:30:04   17   can steer that in the direction of the target sound signal

01:30:07   18   emitted by the target sound source in motion.

01:30:10   19   So it needs to have a target sound signal,

01:30:14   20   somebody has to be there as a target sound signal speaking

01:30:17   21   and that person is moving, then this adaptive beamforming

01:30:21   22   allows to steer this beam as the target sound signal is

01:30:24   23   moving.

01:30:25   24   Q.   How many directivity patterns does an Echo with six

01:30:28   25   beams have?

01:30:29 1   A.   I did not hear the last part of your question. Please

01:30:35 2   repeat.

01:30:36 3   Q.   Absolutely.

01:30:37 4   How many directivity patterns does an Echo with

01:30:42 5   six beams have?

01:30:42 6   A.   It has permanently six beampatterns.

01:30:47 7   Q.   And are those the directivity patterns?

01:30:49 8   A.   Those are pointing at six different directions, yes.

01:30:52 9   Q.   Can you show us how the performing adaptive beamforming

01:30:55 10 for steering step works in connection with other steps in

01:30:59 11 Claim 1?

01:31:00 12 A.   Yes, I can. If you don't mind going to --

01:31:07 13 Q.   So what do we see here?

01:31:09 14 A.   What I'm doing is only giving a high level, a few words

01:31:16 15 of each one of the number of -- Claim No. 1 that it

01:31:22 16 requires, just to illustrate what the requirements are.

01:31:24 17   So the first requirement -- what we have on the

01:31:27 18 left is Figure 16A from the patent, '049. And on the left

01:31:36 19 what we see is that -- let's focus only on the middle of it

01:31:40 20 which has M_1, M_2, M_3, M_4. There are eight microphones

01:31:47 21 positioned around the circle on the left.

01:31:51 22 Q.   And what is shown in the next slide here?

01:31:53 23 A.   On the right, what we have is that as the -- so I'm

01:31:58 24 going to go through each one of these steps.

01:32:00 25   So this is the first one, Part [a], was providing

01:32:05 1 a microphone array. So we have provided that -- we have --

01:32:09 2 the -- I'm describing the patent, so I apologize. When I

01:32:10 3 saw we, I mean I'm trying to describe the patent.

01:32:15 4   What the patent requires is that, [a], providing a

01:32:21 5 microphone array system; [b], receiving the said sound

01:32:25 6 signals, so now the speaker is talking and the said sound

01:32:26 7 signal comes in; [c], determining a delay.

01:32:28 8   And this determining a delay, you need to know

01:32:31 9 where the sound signal is coming in, because one of the

01:32:34 10 angles that you need to calculate is this azimuth angle

01:32:36 11 that we've been talking about for the past few days. You

01:32:39 12 need to calculate that.

01:32:39 13   And to know that, you need to know where the said

01:32:43 14 sound signal is coming from. And then from that, you

01:32:46 15 determine a delay. Then determining a delay, it enables

01:32:51 16 beamforming.

01:32:51 17   Now you're able -- you have all the information to

01:32:54 18 enable beamforming. And then you form the beam.

01:32:56 19   And then Part [e] is saying that you have the

01:33:02 20 ability and capability to steer the beam. So we're -- as

01:33:05 21 the speaker is moving around, the coefficients are updated

01:33:09 22 and changed because now the delays are calculated in

01:33:12 23 real-time. The delays are calculated in real-time based on

01:33:17 24 the new angles as the speaker is moving.

01:33:18 25   From those angles, you calculate the new

01:33:21   1   coefficients.   From the new coefficients, you form new

01:33:25   2   beams, and steer the beams in different directions as the

01:33:30   3   speaker is moving.

01:33:30   4   Q.   Do any of the Echo devices perform adaptive beamforming

01:33:34   5   for steering a directivity pattern?

01:33:35   6   A.   No, sir, they do not.   Echo devices have a fixed beam.

01:33:38   7   The beams are always fixed at the same direction all the

01:33:42   8   time.

01:33:43   9   Q.   Looking back at the, quote, claim language, can you

01:33:47   10   give us a comparison between the '049 patent's requirements

01:33:53   11   in Claim 1 and how Echo works?

01:33:55   12   A.   Yes.   If we can --

01:34:04   13   Q.   Why do we see a table with no numbers on the left?

01:34:07   14   A.   So what I have here -- before we go there -- is that I

01:34:13   15   have two columns.   On the left I have the -- what the

01:34:13   16   patent requires, and on the right I have what Echo is

01:34:16   17   actually doing.   Let's focus on the left.

01:34:18   18   Again, the same eight microphones, and I have a

01:34:21   19   table on top.   This table are the coefficients for forming

01:34:24   20   the beams.   I need those coefficients to form the beams.

01:34:27   21   Q.   And here we don't yet see anyone speaking; is that

01:34:30   22   correct?

01:34:30   23   A.   We don't see anybody speaking, so no beams are formed

01:34:34   24   and no coefficients are there.

01:34:35   25   Q.   And that's with the patent?

01:34:38   1   A.   That's what the patent requires, yes.

01:34:40   2   Q.   And, by comparison, even before someone speaks, what do

01:34:43   3   we see for Echo?

01:34:44   4   A.   So, on the right side, what you see is the Echo. As I

01:34:49   5   mentioned already, the Echo has coefficients that are

01:34:52   6   already pre-set in the factory. So the beams are formed.

01:34:56   7   And those beams are pointing at the specific

01:34:58   8   directions that the designer designed it at, and we add the

01:35:02   9   coefficients. And those coefficients are pre-set, and they

01:35:04   10 are constant. They do not change.

01:35:06   11 Q.   Can you show us what happens when someone speaks to a

01:35:10   12 device using the patent?

01:35:11   13 A.   What the patent requires is that when somebody speaks,

01:35:15   14 based on the delays, on all the steps I described already

01:35:19   15 in the previous slides, then it forms a patent [sic] and it

01:35:22   16 fills up the coefficients.

01:35:24   17   And as you can see, I want to focus a little

01:35:27   18 bit -- if you can repeat the slide again, if you don't

01:35:29   19 mind.

01:35:30   20   As you can see, as the person is moving, the

01:35:34   21 coefficients are changing.

01:35:37   22 Q.   Did you mean to say this forms a beam?

01:35:41   23 A.   Yes, forming the beam. Yes, thank you.

01:35:44   24 Q.   Can you compare that to what we see on the right side

01:35:48   25 when someone speaks to an Echo device?

01:35:50   1   A.   When somebody speaks on the right side, the Echo beams

01:35:53   2   do not change directions.   They are at exactly the same

01:35:58   3   place they were.   They're all constantly receiving the

01:36:00   4   signal.   And the one that hears the speaker the best or has

01:36:05   5   a better signal is the one that's going to be selected.

01:36:08   6   And that's the one that's -- you can see No. 3, for

01:36:12   7   example.

01:36:12   8   And what the coefficients here -- I want to point

01:36:14   9   out again, the coefficients here do not change.   The

01:36:17 10   coefficients are not adaptive.   They are constant, and they

01:36:21 11   stay the same.

01:36:21 12   Q.   Is there a difference between beamforming and beam

01:36:26 13   selection?

01:36:27 14   A.   Excuse me.

01:36:30 15   Yes, sir, there is a significant difference

01:36:35 16   between them.   They are two different things.

01:36:37 17   Q.   Can you summarize some of the differences that we've

01:36:40 18   seen so far between the '049 patent and the Echo?

01:36:48 19   A.   Yes.   If you don't mind, let's go to the next slide.

01:36:50 20   And, again, here what I've done, on the left is

01:36:52 21   the '049 patent requirements.   This is what the claim

01:36:56 22   requires.   These are all the steps that must be done

01:36:58 23   exactly as is pointed out.

01:37:00 24   And on the right is what the Echo device does.

01:37:03 25   Q.   And, to be clear, the -- well, could you read the items

01:37:06 1 on the left under '049 patent?

01:37:08 2 A. Yes. On the left, what we have is that there are

01:37:12 3 four -- there are four -- this is a summary, so there are

01:37:16 4 five steps involved in there.

01:37:17 5   It receives the sound, determines a delay based on

01:37:21 6 the sound -- because if you remember, I was talking about

01:37:24 7 azimuth and all these angles, it has to determine those

01:37:28 8 angles.

01:37:28 9   Then it forms a beam based on the determination of

01:37:33 10 the delay in real-time. Then once it has that, then it

01:37:38 11 steers that, but it only forms one beam, and that one beam

01:37:42 12 is the one that's the steering.

01:37:43 13 Q. So given that the claim doesn't specifically describe

01:37:46 14 only having one beam, can you explain why you, with your

01:37:50 15 experience, understand that there's one beam without

01:37:53 16 selection in the '049 patent?

01:37:55 17 A. Yes. Because what you've done is that you have created

01:38:04 18 a -- really all the coefficients are used to specifically

01:38:07 19 create a beam that is focusing towards the speaker. You're

01:38:12 20 not selecting them on many different beams. You have

01:38:15 21 designed this adaptively customized coefficients for that

01:38:19 22 direction in there. So, I mean, this --

01:38:23 23 Q. Can you --

01:38:24 24 A. Yes.

01:38:25 25 Q. -- can you explain what we see on the right side for

01:38:27   1   Echo?

01:38:27   2   A.   Thank you.   On the right, what we see is that the Echo

01:38:32   3   has pre-set coefficients.   It has permanent beams.   The

01:38:38   4   beams are the same.   They're pointing all at specifically

01:38:42   5   set directions when it leaves the factory.

01:38:46   6   And when you bring it in the house and you plug it

01:38:49   7   in, it receives the sound.   The beams are already formed.

01:38:55   8   All the beams are listening constantly at six different

01:38:58   9   directions.

01:38:59   10   And if it happens that somebody speaks and says

01:39:05   11   "Alexa," the beam -- all the beams process in the list.

01:39:10   12   But the one that is closest and has the best --

01:39:12   13   not the closest -- the one that has the best

01:39:15   14   signal because -- it may not be closest -- the one that has

01:39:19   15   the best signal is going to be the one that is selected in

01:39:22   16   Step No. 4.

01:39:23   17   Q.   Are the differences between the '049 patent and the

01:39:25   18   Echo significant?

01:39:26   19   A.   They're substantially different.   They're very

01:39:28   20   different.

01:39:29   21   Q.   Did you observe Mr. McAlexander testify regarding this

01:39:34   22   Slide 44 in his presentation?

01:39:37   23   A.   Yes, sir, I did.

01:39:39   24   Q.   Did this drawing show determining a delay as required

01:39:42   25   by the '049 patent?

01:39:44   1   A.   No, sir, it does not.

01:39:46   2   Q.   Did you hear testimony in this case regarding the light

01:39:50   3   ring on the top of the Echo?

01:39:52   4   A.   Yes.   I also had -- had the products tested myself.

01:39:58   5   Q.   Is a light ring a beam?

01:40:00   6   A.   The light -- the light is not a beam.   The light is

01:40:04   7   simply an LED.

01:40:05   8   Q.   Did you observe Mr. McAlexander testify regarding

01:40:09   9   Slide 45 from his presentation, as shown here?

01:40:13   10   A.   Yes, sir, I did.

01:40:14   11   Q.   Is this an accurate description of how the Echo

01:40:18   12   products perform beamforming?

01:40:20   13   A.   No, it's not.

01:40:21   14   Q.   Can you explain?

01:40:24   15   A.   Yes.   First, let's focus on the left on the little

01:40:30   16   software code that's in there, if you don't mind.

01:40:33   17   And, in there, it is a -- a few lines -- about

01:40:37   18   nine lines of a file called sdb.cpp, which is, again, one

01:40:44   19   of the files -- it's for -- really SDB stands for super

01:40:51   20   directive beamforming.   Let me slow down.   Super directive

01:40:54   21   beamforming.   And it's the source code that is run on the

01:40:56   22   device.

01:40:56   23   And this is only a few lines.   First few lines of

01:41:00   24   this file -- I remember this file.   It's a significantly

01:41:03   25   large file.   And -- and SDB::process -- this is -- this

01:41:10   1   means this is a process. It's a soft routine, if you're

01:41:11   2   familiar with what software means. And then it has a

01:41:13   3   number of inputs.

01:41:15   4   For example, it says AudioFramePointer. It's

01:41:22   5   pointing to fbfIn, which is fixed beamformer input signal,

01:41:27   6   and then another -- another variable, which is at the end

01:41:29   7   of that first line, fbfOut. And then there's a couple of

01:41:33   8   things in here. It's just the beginning of this routine.

01:41:35   9   There is nothing about delay here.

01:41:37 10   And all it has is at No. 77, it says: If not

01:41:42 11   bypass -- means that if I do not bypass the beamforming, do

01:41:44 12   the following. So the real following is really what's

01:41:46 13   happening afterwards.

01:41:47 14   Q. Did you hear Mr. McAlexander testify regarding the Fast

01:41:53 15   Fourier Transformations?

01:41:54 16   A. Yes, sir, I did.

01:41:55 17   Q. Does performing a Fast Fourier Transformation

01:41:59 18   inherently involve some determination of a delay to

01:42:03 19   calculate -- or, sorry, to satisfy that step in the patent

01:42:05 20   claim?

01:42:05 21   A. I disagree. It does not.

01:42:13 22   MR. LAQUER: And if we could pull up PTX-386.

01:42:27 23   THE TECHNICIAN: 386?

01:42:29 24   MR. LAQUER: Yes. Thank you.

01:42:31 25   Q. (By Mr. Laquer) Do you recall Mr. McAlexander

01:42:33 1   testifying regarding PTX-386?

01:42:38 2   A.   Yes, sir. I have a hard time reading it from here, let

01:42:42 3   alone the audience --

01:42:43 4   MR. LAQUER: Can we expand just the top part

01:42:46 5   there?

01:42:46 6   A.   Yes, I do.

01:42:47 7   Q.   (By Mr. Laquer) Do you know what type of a file this

01:42:49 8   is?

01:42:49 9   A.   This is a -- one of the MATLAB files that I was talking

01:42:54 10 about. This is done by the Amazon engineers in their labs

01:43:00 11 to determine and simulate the Echo system and find some of

01:43:10 12 the coefficients.

01:43:10 13 Q.   Is it even possible for this to be run on an Echo?

01:43:13 14 A.   No. MATLAB file does not run on an Echo. This is

01:43:16 15 simply simulations that is done in advance and trying to

01:43:23 16 perform some simulations here.

01:43:24 17 Q.   Does anything that's done in MATLAB determine anything

01:43:28 18 based on any actual sound?

01:43:31 19 A.   Anything -- this is not run on the device itself. So,

01:43:37 20 no, it does not. In MATLAB, this has nothing to do with

01:43:39 21 the real voice.

01:43:41 22 Q.   But does it have -- in MATLAB, is there any use of

01:43:44 23 actual sound?

01:43:45 24 A.   No, because there is no real sound that is being

01:43:47 25 generated here. In simulations, they generate sound here

01:43:51   1   to perform the process and calculations here, but there is

01:43:55   2   no real audio signal. And there is no target sound source.

01:43:58   3   There is none of these things that the patent

01:44:01   4   requires for any of the calculations in here. This is all

01:44:04   5   done in the factory by the Amazon designers in advance.

01:44:08   6   MR. LAQUER: Let's go back to the claim language

01:44:15   7   here.

01:44:16   8   Q. (By Mr. Laquer) Do any of the Echo devices -- sorry,

01:44:19   9   is there any other claim limitation that you would like to

01:44:22   10   discuss here in Claim 1?

01:44:24   11   A. Yes, I do. If you don't mind, give me a second. Yeah,

01:44:28   12   let's go to A1 if you don't mind, please.

01:44:31   13   Q. So we see the digital signal processor is highlighted?

01:44:34   14   A. Yes. Thank you.

01:44:39   15   Q. Did you use the Court's construction of a digital

01:44:42   16   signal processor in analyzing this limitation?

01:44:43   17   A. Yes, I did. A digital signal processor, as constructed

01:44:46   18   by the Court, is: The processor that is specialized for

01:44:51   19   mathematical processing of digital signals.

01:44:55   20   Q. Is there any difference between the Echo products in

01:44:58   21   this case regarding whether or not they have a digital

01:45:02   22   signal processor?

01:45:02   23   A. There is. And if you go to the next slide, I can

01:45:04   24   describe that.

01:45:05   25   So if you remember a few slides ago, I -- when I

01:45:09 1 showed -- I think it was the second or third slide that I

01:45:11 2 had at the beginning of my presentation, my testimony, I

01:45:15 3 talked about the Doppler products and the MPAF products.

01:45:19 4   So the Doppler products that were first designed

01:45:22 5 and produced before April of 2016, the name of the device

01:45:30 6 is on top, as you can see. Those are Echo and Pancake.

01:45:34 7 And they use -- the yellow is a digital signal processor.

01:45:39 8   So those two devices did -- did use a digital

01:45:45 9 signal processor. And actually within the processor they

01:45:47 10 were using, is a DSP, or the digital signal processor,

01:45:51 11 called Texas Instrument TI3200, that I'm very familiar

01:45:57 12 with. I've been teaching that processor for many years.

01:46:01 13 Q. And is it your understanding that this is an internal

01:46:05 14 Amazon document?

01:46:05 15 A. Yes, it is. It is Amazon -- it has Amazon number at

01:46:11 16 the bottom 5158.

01:46:14 17 Q. Why do we see CPU for some of the boxes on the right

01:46:19 18 where on that same row there is DSP on the left?

01:46:22 19 A. So what CPU stands for -- stands for central processing

01:46:28 20 unit. It's a general purpose processor.

01:46:32 21   So then later on, Amazon, for their projects after

01:46:32 22 April of 2016, they used general processors, and the two

01:46:37 23 that -- that they have used I've studied are the MediaTeks

01:46:43 24 and the Intel Neons.

01:46:49 25 Q. Can you explain how Amazon's change of the type of

01:46:53 1 processor that it uses affects your analysis of this

01:47:01 2 digital signal processor requirement in Claim 1 of the

01:47:03 3 patent?

01:47:03 4 A. So on this requirement for Claim 1, the top two

01:47:14 5 products in Doppler, in my opinion, they do meet that

01:47:16 6 requirement. And they perform that. They have a DSP on

01:47:19 7 their products, which is using the Texas Instrument digital

01:47:23 8 signal processor as part of that DSP.

01:47:26 9 Q. And, to be clear, though, for those products that do

01:47:29 10 have a DSP, are there other requirements from the patent

01:47:32 11 claim that those products do not perform?

01:47:35 12 A. Yes.

01:47:35 13 Q. And so is every requirement of the patent claim

01:47:41 14 necessary to be performed for there to be infringement?

01:47:44 15 A. Yes. What I'd like to do is -- is I'll come back to --

01:47:52 16 in a couple of slides to that. But what I'd like to do is

01:47:55 17 remind you all that there are -- there are two other claim

01:47:58 18 requirements that the Doppler products do not meet. And we

01:48:01 19 discussed them already.

01:48:03 20   The third requirement that I'm talking about,

01:48:05 21 which is a requirement [C] and a requirement [E], so the

01:48:12 22 Doppler products do not meet that. The Doppler products do

01:48:16 23 meet the top one, which is a digital signal processor.

01:48:19 24 Q. So for the MPAF products, is it your opinion whether or

01:48:22 25 not those products satisfy Step 1 of Claim 1?

01:48:27   1   A.   That's correct.   So I'd like to put an X on that.

01:48:37   2   Q.   Does that X reflect -- well, can you explain whether or

01:48:41   3   not the MPAF products do or do not have a digital signal

01:48:43   4   processor?

01:48:43   5   A.   The MPAF products -- the MPAF products -- products do

01:48:47   6   not have a digital signal processor, and they do not meet

01:48:50   7   this claim requirement.

01:48:53   8   Q.   What is different about the processor of the MPAF

01:48:58   9   products compared to a digital signal processor as

01:49:00   10 construed in this case?

01:49:01   11 A.   Well, we are looking at the Court constructions of a

01:49:08   12 digital signal processor, what it means.   And my analysis

01:49:10   13 is based on that, and also my experience of working with

01:49:16   14 digital signal processors for the past 35 years.   And those

01:49:20   15 two are using the Intel Neon and the MediaTek processors

01:49:27   16 that are not digital signal processors.   Those are general

01:49:30   17 processors, general purpose processors or CPUs.

01:49:33   18 Q.   Did you hear Mr. McAlexander testify that some of the

01:49:36   19 accused Echo products use a MediaTek MT7658 processor?

01:49:43   20 A.   Can you repeat the number?

01:49:45   21 Q.   MT7658.

01:49:50   22 A.   Yes, actually, that refreshes my mind.   I did look at

01:49:53   23 that -- I -- I have not heard of that processor before by

01:49:59   24 MediaTek.   So I looked online.   Also, I looked at the

01:50:02   25 MediaTek data sheet itself.   I did not find that processor.

01:50:06   1   And I Googled, and it was somewhere -- in a

01:50:09   2   Wiki -- on a couple of sites I saw there was a processor of

01:50:12   3   such. But I could not verify what it is and on what I was

01:50:16   4   trying to do. But I did not see it on the MediaTek

01:50:20   5   website.

01:50:20   6   Q. Is anything that you found online, was that able to

01:50:23   7   tell you what type of performance the MT7658 has?

01:50:27   8   A. Yes. These were -- you know, one of those usual -- it

01:50:30   9   talked about Wi-Fi and Bluetooth processors, Wi-Fi and

01:50:35 10   Bluetooth chips. That's all the information I could get,

01:50:38 11   and I did it again last night myself just to make sure I

01:50:42 12   didn't make any mistake.

01:50:44 13   Q. Have you seen any evidence in this case that that

01:50:49 14   MT7658, if it does exist, is a digital signal processor?

01:50:51 15   A. I cannot tell you. I did not see any information on

01:50:53 16   that using the MediaTek's official website and data sheet.

01:50:59 17   Q. Did you hear Mr. McAlexander testify that providing the

01:51:04 18   microphone array technology that is accused in the Echo

01:51:09 19   devices is about equal to the entire value of the product

01:51:16 20   as customers obtain the product?

01:51:19 21   A. I disagree with that statement.

01:51:20 22   Q. Can you explain why?

01:51:21 23   A. Because at the -- as we heard this morning, and I was

01:51:30 24   here also when Mr. Prasad and Mr. Hilmes talked, and my own

01:51:39 25   information, the Echo is capturing the signal.

01:51:49 1   There is a vast large Cloud of computing. The

01:51:57 2   Alexa is performing many, many steps, the natural

01:52:01 3   languages, artificial intelligence, the machine learning,

01:52:05 4   and so on and so forth. This is significant.

01:52:08 5   This has been going on -- the research in these

01:52:09 6   areas have been going on for many, many many years,

01:52:13 7   starting in Bell Labs. What they have developed is

01:52:16 8   amazing. And that has, as also Mr. Prasad said, thousands

01:52:21 9   of people are working on it. That is the significant part

01:52:23 10 of the Alexa system.

01:52:24 11 Q. So in considering the total technical benefit that the

01:52:29 12 customer of an Echo device receives from the product, what

01:52:32 13 amount of the benefit is from the microphone array, if you

01:52:35 14 were to give a generous percentage?

01:52:37 15 A. I did the analysis of that. I looked at -- based on my

01:52:43 16 own expertise in terms of what is in there and what are the

01:52:47 17 different components, and I gave a percentage, created a

01:52:51 18 table, and looked at it, and I was being very generous, and

01:52:54 19 I gave it a 5 -- 5.5 percent.

01:52:56 20 Q. Looking at the next slide, you can see Claim 8 listed

01:53:00 21 below Claim 1. And Claim 8 begins with the words "the

01:53:05 22 method of Claim 1" and continues. Do you see that?

01:53:08 23 A. Yes, sir, I do.

01:53:09 24 Q. For your non-infringement analysis, can you explain how

01:53:13 25 your opinion of Claim 1 affects your opinion of Claim 8?

01:53:16   1   A.   Claim 8 depends on Claim 1.   And if the Echo devices do

01:53:23   2   not perform the steps in Claim 1, they also do not infringe

01:53:30   3   the claim.

01:53:31   4   Q.   So stepping back and just speaking about what you've

01:53:34   5   explained and what you've shown us, the comparison between

01:53:37   6   the '049 patent and the way that the Echo devices work, how

01:53:45   7   significant are those differences?

01:53:46   8   A.   In my opinion, they are significantly different.   From

01:53:50   9   the time you turn them on, to all the different steps they

01:53:54   10   go through, all the different processings they do, as soon

01:53:59   11   as you turn on the Echo devices, all the beams turn on, the

01:54:04   12   microphones capturing the signal, the beams are formed, and

01:54:07   13   it's listening.

01:54:08   14   And, as I explained, the '049 patent requires all

01:54:11   15   these different steps, able to perform the beams and the

01:54:16   16   calculations needed and then perform adaptive beamforming

01:54:18   17   and steering, so...

01:54:21   18   Q.   Looking back at the slide, do any of the Echo devices

01:54:29   19   in this case infringe either Claim 1 or Claim 8 of the '049

01:54:35   20   patent?

01:54:35   21   A.   No, they do not.

01:54:38   22   MR. LAQUER: I pass the witness.

01:54:39   23   THE COURT: Cross-examination by the Plaintiff.

01:54:53   24   Are there binders to distribute, counsel?

01:54:56   25   MR. LAMBRIANAKOS: Yes, Your Honor.

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01:54:58   1              THE COURT:  Let's do that now.

01:55:04   2              THE WITNESS:  Your Honor, while they're getting

01:55:06   3    the binders, can I also get another water bottle?

01:55:10   4              THE COURT:  Somebody from the Defendants' table

01:55:12   5    will --

01:55:13   6              THE WITNESS:  Thank you.

01:55:13   7              THE COURT:  -- bring you another water.

01:55:16   8              THE WITNESS:  Thank you, Your Honor.

01:55:21   9          Thank you, sir.  Thank you.

01:55:23   10             COURT SECURITY OFFICER:  Uh-huh.

01:55:26   11             THE COURT:  Whatever that noise was, let's don't

01:55:28   12   do it again.

01:55:30   13             All right.  Let's proceed.

01:55:31   14             THE WITNESS:  I apologize, Your Honor.

01:55:31   15                       CROSS-EXAMINATION

01:55:34   16   BY MR. LAMBRIANAKOS:

01:55:34   17   Q.  Good afternoon, Dr. Kiaei.

01:55:36   18   A.  Good afternoon, sir.

01:55:37   19   Q.  Are you one of the world's leading acoustic processing

01:55:41   20   experts?

01:55:41   21   A.  I -- I have worked on acoustic and audio processing for

01:55:51   22   many years.

01:55:51   23   Q.  Do you agree with counsel's statement in openings that

01:55:54   24   you're one of the world's leading acoustic processing

01:56:02   25   experts?
```

01:56:03 1 A. Counsel was generous. I would say that I am an expert

01:56:05 2 in this area.

01:56:05 3 Q. But are you one of the world's leading experts in this

01:56:09 4 area of acoustic processing?

01:56:10 5 A. I am well-known in my research work, and I'm also --

01:56:13 6 yes, I am.

01:56:14 7 Q. You have a website, don't you, Dr. Kiaei, where you

01:56:17 8 market yourself as an expert?

01:56:18 9 A. Yes, I do.

01:56:19 10 Q. Is that hitechexpertwitness.com?

01:56:22 11 A. Yes, it is.

01:56:23 12 Q. On that website, you identify your areas of technical

01:56:30 13 expertise?

01:56:30 14 A. Yes. And before I go further in that, I want to

01:56:33 15 emphasize that that website, I developed myself, and I

01:56:37 16 haven't worked on it much. So that website is still

01:56:42 17 underdeveloped. There's many things missing in that

01:56:43 18 website. It is my own creation.

01:56:44 19   THE COURT: Just a minute.

01:56:45 20   Dr. Kiaei, you're here to answer the counsel's

01:56:47 21 questions. You're not here to offer explanations that are

01:56:50 22 not called for by the questions.

01:56:52 23   If he wants to know about the status of your

01:56:55 24 website and is it complete and is it still being worked on,

01:56:58 25 he will ask that, but limit your answers to the questions

01:57:01 1 that are asked, please, sir.

01:57:03 2   THE WITNESS: Yes, Your Honor. Thank you. I

01:57:04 3 will.

01:57:04 4   THE COURT: Let's proceed, counsel.

01:57:06 5   MR. LAMBRIANAKOS: Your Honor, can we strike the

01:57:08 6 portion of his answer following his initial response?

01:57:10 7   THE COURT: I'll retain the answer, yes. The rest

01:57:14 8 of it and before I go further, et cetera, I will strike as

01:57:17 9 non-responsive.

01:57:18 10   Let's proceed.

01:57:20 11 Q. (By Mr. Lambrianakos) And you have this website to

01:57:22 12 help you get hired as an expert witness, right?

01:57:25 13 A. Yes, I do.

01:57:26 14 Q. Because you enjoy this kind of work, right?

01:57:28 15 A. Yes, I do.

01:57:29 16 Q. And it's lucrative; you bill $400.00 an hour for your

01:57:32 17 opinions, right?

01:57:32 18 A. Yes, I do.

01:57:34 19 Q. Now, on that website, you list areas of technical

01:57:41 20 expertise that you believe you bring to a potential client,

01:57:45 21 right?

01:57:45 22 A. Yes, I do.

01:57:46 23 Q. And you say on that website that you're an expert

01:57:50 24 witness in wireless and wireline communications, right?

01:57:53 25 A. Yes, sir.

```
01:57:54   1   Q.   Integrated circuits?

01:57:56   2   A.   Yes, sir.

01:57:56   3   Q.   Radio frequency?

01:57:58   4   A.   Yes, sir.

01:58:00   5   Q.   Power management?

01:58:01   6   A.   Yes, sir.

01:58:03   7   Q.   Bioelectronics, right?

01:58:04   8   A.   Yes, sir.

01:58:05   9   Q.   You don't say that you -- you are an expert in acoustic

01:58:12  10   processing, do you?

01:58:13  11   A.   I have not indicated that.

01:58:15  12   Q.   In fact, you have a resume that you link to your

01:58:19  13   website, right?

01:58:20  14   A.   Yes, sir.

01:58:20  15   Q.   Someone can click a button and download your -- your

01:58:24  16   resume?

01:58:25  17   A.   Yes, sir.

01:58:25  18   Q.   And your resume is, of course, complete and truthful,

01:58:30  19   right?

01:58:30  20   A.   Yes, sir, it is.

01:58:31  21   Q.   You wouldn't put anything on your resume that wasn't

01:58:36  22   accurate, right?

01:58:37  23   A.   Yes, sir.

01:58:37  24   Q.   And your -- your resume lists several fields of

01:58:41  25   specialization right -- right at the beginning, doesn't it?
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01:58:44	1	A. Yes, it does.
01:58:45	2	Q. And it includes communication systems, right?
01:58:48	3	A. Yes, sir.
01:58:48	4	Q. Wireless and wireline communication systems?
01:58:53	5	A. Yes, sir.
01:58:54	6	Q. Radio frequency integrated circuits?
01:58:59	7	A. Yes, sir.
01:58:59	8	Q. Analog and digital integrated circuits?
01:59:04	9	A. Yes, sir.
01:59:04	10	Q. Sensors?
01:59:05	11	A. Yes, sir.
01:59:05	12	Q. Bioelectronics?
01:59:07	13	A. Yes, sir.
01:59:07	14	Q. And power management IC?
01:59:10	15	A. Yes, sir.
01:59:10	16	Q. Doesn't include acoustic processing, right?
01:59:14	17	A. You're correct.
01:59:18	18	Q. Your resume is, what, about 23 pages long? But it
01:59:22	19	never mentions acoustic processing once, does it?
01:59:25	20	A. No, it doesn't.
01:59:26	21	Q. You're familiar with the standard for determining
01:59:35	22	patent infringement, right?
01:59:36	23	A. Yes, sir.
01:59:37	24	Q. The first step in the infringement analysis is to
01:59:40	25	understand the scope of the claims?

01:59:43   1   A.   Yes, sir.

01:59:45   2   Q.   And you agree that the claimed invention is defined by

01:59:48   3   the words in the claims, right?

01:59:51   4   A.   Yes.   The claim -- what is claimed in the patent is

01:59:57   5   described in the body of the patent.   You have to read the

02:00:02   6   body of the patent.

02:00:04   7   Q.   But you agree that the scope of the invention is

02:00:06   8   defined by the words of the claims, not the specification,

02:00:08   9   right?

02:00:08 10   A.   That is correct, yes, as I mentioned also.

02:00:12 11   MR. LAMBRIANAKOS: Can we have PTX-1, please?   Go

02:00:18 12   to Claim 1.

02:00:20 13   THE COURT: Just a minute, counsel.

02:00:21 14   Mr. Baxter, if you're going to sit in the gallery,

02:00:25 15   you need a mask on, sir.   Everybody in the gallery needs a

02:00:28 16   mask on.

02:00:29 17   MR. BAXTER: Yes, Your Honor.

02:00:31 18   THE COURT: Let's proceed.

02:00:44 19   MR. LAMBRIANAKOS: Put up the whole claim.

02:00:50 20   Q.   (By Mr. Lambrianakos)   So if we're going to have a

02:00:57 21   patent infringement analysis, Dr. Kiaei, you agree that the

02:01:01 22   analysis begins and ends with the words of the claims,

02:01:06 23   correct?

02:01:06 24   A.   Yes, sir.

02:01:08 25   Q.   And you understand that some of the words in this claim

02:01:12   1   have already been defined by the Court?

02:01:17   2   A.   Yes, sir, I understand that.

02:01:18   3   Q.   And you must apply the Court's definitions when

02:01:23   4   understanding the meaning of those words which have been

02:01:26   5   defined by the Court, correct?

02:01:29   6   A.   Yes, sir, I do.

02:01:30   7   Q.   And for the rest of the words, you apply their plain

02:01:34   8   meaning?

02:01:35   9   A.   Yes.   If they have not been defined by the Court, we --

02:01:39   10   we use the plain and ordinary meaning.

02:01:40   11   Q.   And you'd agree that, in your non-infringement

02:01:45   12   analysis, you're not supposed to impose any other

02:01:47   13   requirements for infringement other than what the words of

02:01:50   14   the claim and the Court's constructions require, right?

02:01:53   15   A.   Yes, sir, I agree.

02:01:54   16   Q.   You just testified that Claim 1 of the '049 patent is

02:02:10   17   not infringed by the Echo products because the determining

02:02:14   18   a delay step is not met.   Was that your testimony?

02:02:19   19   A.   That is correct, sir, yes.

02:02:20   20   Q.   And you found that the step wasn't met because the Echo

02:02:24   21   product does not calculate any delays; is that right?

02:02:28   22   A.   That is correct, yes.

02:02:36   23   MR. LAMBRIANAKOS: If we could just zoom in on the

02:02:39   24   determining a delay step, please.

02:02:45   25   Q.   (By Mr. Lambrianakos)   Dr. Kiaei, could you just point

02:02:48   1   to the portion of this claim in which the word

02:02:52   2   "calculating" is found?

02:02:59   3   A.   It's determining a delay.

02:03:04   4   Q.   So when you read the -- the word "determining," you're

02:03:09   5   requiring a calculation; is that right?

02:03:10   6   A.   It is determining a delay.

02:03:13   7   Q.   Yes or no, sir, when you read the word "determining,"

02:03:19   8   you are finding a requirement of calculation?

02:03:27   9   A.   If determining a delay, yes.

02:03:32   10   Q.   Now, you also said that that calculation had to happen

02:03:36   11   in real-time.   Remember that?

02:03:37   12   A.   That calculation, yes, but I was discussing that based

02:03:46   13   on the -- yes, I was discussing that based on the Echo

02:03:49   14   products.

02:03:50   15   Q.   Didn't you say, sir, that the claim -- Claim 1 of the

02:03:55   16   '049 patent requires that delay be calculated in real-time?

02:03:59   17   Wasn't that your testimony, sir?

02:04:01   18   A.   That was -- what I meant was determining a delay is --

02:04:08   19   is the requirement in there.

02:04:10   20   Q.   So it's not your testimony that this step requires that

02:04:16   21   the calculation take place in real-time?

02:04:19   22   A.   No.   This does not require -- the claim language here

02:04:23   23   does not require a determining a delay in real-time.

02:04:26   24   Q.   Is there anything in this claim that prohibits the

02:04:30   25   coefficients from being preloaded into the device for the

02:04:34	1	calculation of a delay?
02:04:44	2	A. No, I don't see anything that prevents that, as long as
02:04:51	3	you know where the target sound source is.
02:04:54	4	Q. So if the coefficents can be preloaded, then can't
02:05:05	5	determining a delay be simply choosing the appropriate
02:05:08	6	coefficients depending on the target sound source?
02:05:10	7	A. If you know the target sound source, you can determine
02:05:13	8	the coefficients, yes.
02:05:13	9	Q. Now, you submitted an expert report in this case on
02:05:22	10	June 1, 2020, that contained all your opinions regarding
02:05:28	11	non-infringement that you were going to bring to trial
02:05:30	12	today; isn't that right?
02:05:31	13	A. Yes, sir, I did.
02:05:32	14	Q. And you know that the only opinions that you can bring
02:05:36	15	to trial are those which you've previously disclosed in
02:05:40	16	your expert report, correct?
02:05:41	17	A. Yes, sir, it is.
02:05:43	18	Q. And you identified in your report all of the materials
02:05:47	19	that you considered, in coming to those opinions, right?
02:05:50	20	A. Yes, sir, I did.
02:05:52	21	Q. And you named all of the individuals with whom you
02:05:54	22	consulted, in determining your opinions, correct?
02:06:01	23	A. Individuals I consulted?
02:06:03	24	Q. Yes.
02:06:06	25	A. Can you refresh my mind where I said that in my report?

02:06:09 1 Q. I'm asking you whether or not your report identifies

02:06:13 2 all individuals, aside from counsel, with whom you

02:06:17 3 consulted, in order to determine what your opinions are and

02:06:20 4 which were disclosed in your report?

02:06:23 5 A. No.

02:06:23 6 Q. So you had conversations with individuals outside of

02:06:26 7 those which were identified in your Materials Considered

02:06:29 8 section?

02:06:30 9 A. I don't believe so, no.

02:06:32 10 Q. So your Materials Considered section of your report is

02:06:37 11 a complete listing of all of the information that you

02:06:41 12 relied on, in coming to your opinions, right?

02:06:43 13 A. Yes, sir.

02:06:44 14 Q. And if you consulted with an Amazon engineer, for

02:06:50 15 example, you would have listed that in your materials

02:06:52 16 considered, right?

02:06:54 17 A. I believe so, yes. Yes.

02:06:56 18 Q. You indicated during your testimony that you found the

02:07:06 19 source code to be the most important information that you

02:07:08 20 used in determining non-infringement; is that right?

02:07:10 21 A. That's correct, sir, yes.

02:07:14 22   MR. LAMBRIANAKOS: Can we have DDX-5, Page 12,

02:07:20 23 please?

02:07:20 24 Q. (By Mr. Lambrianakos) These are the MATLAB files that

02:07:25 25 you said you reviewed in coming to your opinions, correct?

02:07:28 1   A.   Yes.   This is some of the MATLAB files I looked at,

02:07:32 2   yes.

02:07:33 3   Q.   Just a sample?

02:07:34 4   A.   Yes.

02:07:34 5   Q.   Do you know who authored these files?

02:07:40 6   A.   I don't remember.   Some of them had names on them.

02:07:45 7   Some of them don't.   I don't remember.

02:07:47 8   Q.   If I told you that the top of the -- each of the first

02:07:50 9   page of all of these files but two identifies an author

02:07:57 10 Amit Chhetri, or AC, would you disagree with that?

02:08:00 11 A.   No, I don't disagree with that.   I believe you're

02:08:03 12 correct.

02:08:03 13 Q.   And you understand that Mr. Chhetri was the author of

02:08:08 14 most of these files, right?

02:08:09 15 A.   My recollection, he was one of them.   I -- I wouldn't

02:08:15 16 categorize most of them, but, yes, I've seen his name on

02:08:18 17 those.

02:08:18 18   MR. LAMBRIANAKOS: Could we put PTX-1378-28 on the

02:08:23 19 screen?

02:08:24 20 Q.   (By Mr. Lambrianakos)   You see at the top of

02:08:30 21 PTX-1378-28 the author's identified as Amit Chhetri?

02:08:33 22 A.   Yes, that is Dr. Chhetri.

02:08:35 23 Q.   It's your understanding that Dr. Chhetri wrote the code

02:08:39 24 that's in this file?

02:08:40 25 A.   If his name is on top of it, that's my assumption, yes.

02:08:46 1 Q. Sir, you don't disagree that wherever his name or

02:08:48 2 initials appear at the top of a code file, that he's the

02:08:51 3 author, right?

02:08:53 4 A. Can you repeat the question, please?

02:08:54 5 Q. You don't disagree that if his name or initials appear

02:08:58 6 as author at the top of the file, that he was, in fact, the

02:09:01 7 author of that file?

02:09:02 8 A. He is the author of this, yes.

02:09:04 9 Q. Now, when you reviewed all the source code, you

02:09:07 10 understood that Mr. Chhetri was the author of the code.

02:09:09 11 You didn't consult with Mr. Chhetri to understand the

02:09:13 12 functionality that was set forth in those files, did you?

02:09:17 13 A. I have never spoken to Mr. Chhetri.

02:09:20 14 Q. So you didn't think it was important to go to the

02:09:22 15 author of the source code to get a full understanding of

02:09:26 16 the functionality of that source code?

02:09:26 17 A. No, I did not. I don't think that is necessary.

02:09:29 18 Q. So sitting here today, you've never -- you've never

02:09:35 19 consulted with Mr. Chhetri regarding your opinions in this

02:09:37 20 case, right?

02:09:38 21 A. I have not.

02:09:39 22 Q. So you don't know whether Mr. Chhetri, the author of

02:09:42 23 this code, agrees with your conclusions regarding the

02:09:45 24 functionality in the source code?

02:09:47 25 A. The source code is -- I have not consulted with

02:09:57   1   Mr. Chhetri at all, but understanding the source code is

02:10:01   2   for an engineer and somebody who's an expert in knowing

02:10:03   3   that. It's pretty clear.

02:10:07   4   MR. LAMBRIANAKOS: Move to strike that answer as

02:10:10   5   non-responsive, Your Honor.

02:10:24   6   THE COURT: Sustained.

02:10:25   7   Q. (By Mr. Lambrianakos) Yes or no, sir, sitting here

02:10:27   8   today, you do not know whether Mr. Chhetri agrees with your

02:10:27   9   conclusions regarding the functionality set forth in his

02:10:33   10 source code?

02:10:33   11 A. I do not know whether he agrees or disagrees.

02:10:46   12   MR. LAMBRIANAKOS: Can we have the McAlexander

02:10:51   13 Presentation Slide 12, please?

02:10:56   14 Q. (By Mr. Lambrianakos) Dr. Kiaei, you just testified

02:10:58   15 that there were certain processors which did not meet the

02:11:01   16 Court's digital signal processor limitation. Do you recall

02:11:04   17 that?

02:11:04   18 A. Yes, sir, I do recall that.

02:11:06   19 Q. And you didn't show in your presentation what the

02:11:12   20 construction was that you were applying, right?

02:11:14   21 A. I was discussing the digital signal processor and what

02:11:20   22 the construction is, on the right.

02:11:25   23 Q. So do you see in the first line of this table, it says:

02:11:31   24 Digital signal processor is being construed as

02:11:32   25 microprocessor that is specialized for a mathematical

02:11:36   1   processing of digital signals?

02:11:38   2   A.   Yes, sir.

02:11:38   3   Q.   And that's the construction you applied in this case,

02:11:41   4   right?

02:11:41   5   A.   That's the construction, as well as my own experience

02:11:44   6   of -- yes, it is -- it is the construction I applied, yes.

02:11:48   7   THE COURT: Doctor, would you pull the microphone

02:11:49   8   a little closer so we can make sure we hear you?

02:11:52   9   THE WITNESS: Yes, sir.   Thank you, Your Honor.

02:11:56 10   THE COURT: Thank you.

02:11:56 11   Let's continue.

02:11:58 12   MR. LAMBRIANAKOS: Can we have Slide 35 of that

02:12:00 13   same presentation, please?

02:12:03 14   Q.   (By Mr. Lambrianakos)   Dr. Kiaei, is it your

02:12:05 15   understanding that the MT8516 is one of the processors that

02:12:10 16   is used in Echo products?

02:12:12 17   A.   Yes, it is.   It is one of the processors that are used

02:12:16 18   in the MPAF devices I mentioned.

02:12:20 19   Q.   You see the subtitle here says: Highly integrated,

02:12:26 20   application processing platform for Cloud-connected voice

02:12:30 21   assistant.

02:12:31 22   Do you see that?

02:12:31 23   A.   Yes, sir, I see that.

02:12:32 24   Q.   Are the Echo products Cloud-connected voice assistant

02:12:37 25   devices?

02:12:37 1   A.   I would agree in general, yeah.

02:12:46 2   Q.   Now, the first sentence here says: The MT8516 is an

02:12:51 3   efficient and highly integrated application processing

02:12:55 4   platform with diverse interfaces and connectivity that

02:12:59 5   focuses on audio and microphone processing.

02:13:02 6   Do you see that?

02:13:04 7   A.   Yes, I do see that.

02:13:05 8   Q.   Does that indicate to you, sir, that this processor is

02:13:08 9   specialized for processing digital signals?

02:13:12 10 A.   In terms of the Court construction of the specialized

02:13:18 11 Court construction, that is not -- that is not a digital

02:13:22 12 signal processor.

02:13:22 13   MR. LAMBRIANAKOS: Move to strike as not

02:13:24 14 responsive, Your Honor.

02:13:28 15 A.   No, it is not.

02:13:29 16   THE COURT: I'll overrule that objection.

02:13:32 17 Q.   (By Mr. Lambrianakos) Do you see the second sentence

02:13:34 18 says that it is designed for Cloud-supported voice

02:13:40 19 assistant devices?

02:13:41 20 A.   Yes, sir, I see that.

02:13:43 21 Q.   Does that indicate to you that this processor is

02:13:45 22 specialized for use with Cloud-supported voice assistant

02:13:49 23 devices, such as the Echo?

02:13:50 24 A.   In general, I agree with that, yes.

02:13:53 25 Q.   And then in the second paragraph, it says: MediaTek's

02:13:59 1   unique PowerAQ tool provides an easy GUI interface for

02:14:05 2   signal flow design and audio parameter tuning, removing the

02:14:09 3   need for an additional DSP.

02:14:11 4   Do you see that?

02:14:12 5   A. Yes, I do.

02:14:12 6   Q. So this tells you that the MT8516 eliminates the need

02:14:16 7   to have a chip that is specifically a digital signal

02:14:18 8   processor, correct?

02:14:19 9   A. That's correct, yes.

02:14:21 10 Q. You don't --

02:14:22 11 A. This is.

02:14:23 12 Q. You don't need a separate, discrete digital signal

02:14:25 13 processor when you have the MT8516, right?

02:14:30 14 A. I apologize for interrupting you.

02:14:32 15   Yes, it is saying that this processor will do the

02:14:34 16 job. You don't need to get a DSP for doing this.

02:14:44 17   MR. LAMBRIANAKOS: If you please turn to Slide 36.

02:14:51 18 Q. (By Mr. Lambrianakos) You see this information on the

02:14:54 19 ARM Neon?

02:14:55 20 A. Yes.

02:14:55 21 Q. And the ARM Neon is included in the ARM Cortex-A

02:15:04 22 series, is it not?

02:15:04 23 A. Yes, this is an Intel ARM Neon which is included in

02:15:09 24 there, yes.

02:15:09 25 Q. And the MediaTek MT8516 is also a Cortex-A series chip,

02:15:17   1   right?

02:15:17   2   A.   Yes, these use -- yes, it is.

02:15:19   3   Q.   And in the first paragraph of this sheet, it says: An

02:15:23   4   advanced SIMD, single instruction multiple data,

02:15:27   5   architecture extension for the ARM Cortex-A series and for

02:15:32   6   the Cortex-R52 and Cortex-R82 processors.

02:15:38   7   Do you see that?

02:15:38   8   A.   Yes, sir, I do.

02:15:39   9   Q.   And it says: ARM Neon accelerates audio and video

02:15:45   10   encoding/decoding, user interface, 2D/3D graphics, or

02:15:51   11   gaming.

02:15:51   12   Right?

02:15:52   13   A.   Yes, sir.

02:15:52   14   Q.   Now, audio and video encoding and decoding, that

02:15:59   15   involves the processing of digital signals, doesn't it?

02:16:02   16   A.   Yes, it involves processing of digital signals, as any

02:16:06   17   regular processor also involves processing of digital

02:16:09   18   signals.

02:16:09   19   Q.   But the ARM Neon accelerates that processing, doesn't

02:16:13   20   it?

02:16:13   21   A.   Yes, it does.

02:16:14   22   Q.   The next paragraph says: Neon can also accelerate

02:16:19   23   signal processing algorithms and functions to speed up

02:16:21   24   applications, such as machine or deep learning, audio and

02:16:25   25   video processing, voice or facial recognition, and computer

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02:16:29    1  vision.

02:16:30    2          Do you see that?

02:16:30    3  A.  Yes, sir, I do.

02:16:33    4  Q.  So it appears the Neon is specialized for the purpose

02:16:36    5  of increasing the speed and efficiency of audio and video

02:16:40    6  processing.  Do you agree with that statement?

02:16:42    7  A.  Yes, I agree with that statement.

02:16:47    8  Q.  And the ARM Neon technology is included in the MT8516

02:16:53    9  product, right?

02:16:54   10  A.  Yes, sir.  It's included in the products under MPAF, as

02:16:57   11  I mentioned earlier.

02:16:59   12          MR. LAMBRIANAKOS:  Can we have PTX-321, please?

02:17:22   13  Can you turn to Page 3 of the document?  Right under high

02:17:25   14  level structure, can you zoom in?

02:17:29   15  Q.  (By Mr. Lambrianakos)  You see at the top there it

02:17:32   16  says:  Bishop uses Intel Cherry Trail as a DSP platform

02:17:37   17  which is the same as Knight and Hendrix?

02:17:39   18  A.  Yes, I see that, yes.

02:17:40   19  Q.  Is it your understanding that the Intel Cherry Trail

02:17:43   20  processor is used in the Echo Look and the Echo Show 1st

02:17:47   21  and 2nd Generations?

02:17:48   22  A.  Yes, it is, yes.

02:17:50   23  Q.  Now, previously, you said that the Intel Cherry Trail

02:17:54   24  is a general purpose processor, right?

02:17:57   25  A.  I guess I did not follow your last question.  Can you
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02:18:02   1   elaborate on your last question?

02:18:03   2   Q.   The question about whether the Intel Cherry Trail

02:18:09   3   processor is in the Echo Look, Echo Show, and Echo Show 1st

02:18:15   4   and 2nd Generation; is that right?

02:18:17   5   A.   Yes, if you don't mind, repeat that.

02:18:20   6   Q.   Yes.   Is it your understanding that the Intel Cherry

02:18:28   7   Trail processor is in the Echo Look, the Echo Show 1st, and

02:18:34   8   Echo Show 2nd Generations?

02:18:35   9   A.   I believe so.   Yes, it is on the -- yes, I believe so,

02:18:36   10 but if you have the -- the data for these two products to

02:18:41   11 confirm that, that would be good to have.

02:18:43   12 Q.   All right.   Let's assume that for now.

02:18:45   13 A.   Okay.   Let's assume that you are right.

02:18:46   14 Q.   Do you see that in this Amazon document it states that

02:18:51   15 the Intel Cherry Trail is a DSP platform?

02:18:53   16 A.   Yes, it says that.

02:18:55   17 Q.   And that tells you that the Intel Cherry Trail is a

02:19:00   18 product that specializes in digital signal processing?

02:19:07   19 A.   I don't agree with that.   It says that the Intel Cherry

02:19:10   20 Trail is a platform for the DSP.   This is the product

02:19:12   21 definition -- this is what they use in their description in

02:19:17   22 their data sheet.   That is independent on -- for the Court

02:19:27   23 construction of digital signal processor issue.

02:19:30   24 Q.   You testified earlier that the accused Echo products do

02:19:34   25 not include the claimed adaptive beamformer, right?

02:19:37   1   A.   The accused products do not perform the claims adaptive

02:19:43   2   beamforming based on the Court construction of what the

02:19:46   3   adaptive beamforming is, yes, I did.

02:19:52   4   Q.   And, in your presentation, your discussion of

02:19:56   5   beamforming in the Echo product, that was limited to the

02:19:59   6   fixed beamformer in the Echo products, correct?

02:20:04   7   A.   In the description I had, that was limited to fixed

02:20:10   8   beamformer, and the beam selected after that.

02:20:13   9   Q.   And the fixed beamformer in the Echo products, that's a

02:20:16   10 super directive beamformer, right?

02:20:19   11 A.   It performs some and multiply and some filtering

02:20:28   12 structure that we've discussed already that Mr. Phil and

02:20:33   13 others have shown.

02:20:34   14 Q.   Is that properly characterized as super directive

02:20:41   15 beamforming?

02:20:41   16 A.   The coefficients that are calculated in MATLAB, they

02:20:45   17 use super directive beamforming algorithm, but what is

02:20:49   18 implemented on the Echo products is that the sum and

02:20:53   19 product filtering operation.

02:20:55   20 Q.   Isn't it true, sir, that in characterizing the fixed

02:21:02   21 beamformer in the Echo products, that it is referred to as

02:21:07   22 a super directive beamformer?

02:21:07   23 A.   They are using the coefficients which are obtained by

02:21:13   24 using super directive beamforming as it was in the file

02:21:20   25 super directive beamforming, and those coefficients are

02:21:23 1   obtained offline. Those coefficients then are in the

02:21:27 2   product, and they simply multiplied output of the FFT by

02:21:32 3   those coefficients.

02:21:32 4   Q. Yes or no, sir, is --

02:21:35 5   THE COURT: Counsel, if you think the witness is

02:21:36 6   non-responsive, don't tell him yes or no. You raise it

02:21:39 7   with the Court.

02:21:40 8   MR. LAMBRIANAKOS: Your Honor, I move to strike

02:21:42 9   that answer as non-responsive.

02:21:44 10   THE COURT: I will strike the prior answer as

02:21:46 11   non-responsive.

02:21:47 12   He asked a very direct question, Professor Kiaei,

02:21:52 13   and you gave a lengthy explanation that did not answer the

02:21:54 14   question.

02:22:00 15   Mr. Laquer is going to get an opportunity to ask

02:22:02 16   more questions when Plaintiff's counsel is finished. You

02:22:07 17   need to limit your answers to the questions asked by

02:22:10 18   Mr. Lambrianakos, and then if counsel for Amazon wants to

02:22:12 19   follow up and get a fuller explanation, he'll have that

02:22:16 20   opportunity. And I think you understand that.

02:22:18 21   THE WITNESS: Yes, Your Honor.

02:22:18 22   THE COURT: This is the second time I've asked you

02:22:20 23   to limit your answers to the questions asked. So I'm going

02:22:23 24   to insist on that, okay?

02:22:24 25   THE WITNESS: Thank you, Your Honor. I will.

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02:22:25   1              THE COURT:  Let's proceed.

02:22:33   2   Q.  (By Mr. Lambrianakos)  Is the fixed beamformer in the

02:22:34   3   Amazon Echo products a super directive beamformer?

02:22:36   4   A.  Yes, it is.

02:22:37   5              MR. LAMBRIANAKOS:  Could you please show PTX-334?

02:22:47   6   Q.  (By Mr. Lambrianakos)  During your presentation, you

02:22:49   7   didn't address any component of any Echo product that is

02:22:52   8   termed an adaptive beamformer, correct?

02:22:54   9   A.  I did not have those, yes, sir.

02:22:56  10   Q.  You agree that all the accused Echo products except for

02:23:04  11   Echo 1st Generation and Echo Dot 1st Generation use the

02:23:10  12   MPAF code, M-P-A-F code, correct?

02:23:13  13   A.  Yes, sir, they do.

02:23:14  14   Q.  And in the MPAF code, the primary control interface is

02:23:18  15   called the audio front end, correct?

02:23:21  16   A.  Yes, sir.

02:23:21  17   Q.  And within the audio front end, there's a block called

02:23:29  18   the ABF, or adaptive beamformer block, that is included in

02:23:36  19   the source code on the accused Echo devices, correct?

02:23:38  20   A.  Yes, there is.

02:23:39  21   Q.  And that adaptive beamformer algorithm is executed when

02:23:44  22   doing automatic speech recognition when the Echo device is

02:23:47  23   not doing playback; isn't that right?

02:23:49  24   A.  Yes, sir, that is correct.

02:23:50  25   Q.  But it's your position that this adaptive beamforming
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02:23:58   1   unit in the Echo devices is not the adaptive beamforming

02:24:02   2   unit of the claims; is that right?

02:24:03   3   A.   Yes, sir, that's correct.

02:24:04   4   Q.   And you say that, because in the Echo products, the

02:24:06   5   filter coefficients do not change, right?

02:24:08   6   A.   Yes, sir, because there are two different blocks here.

02:24:16   7   MR. LAMBRIANAKOS: Can we have the Slide 14 from

02:24:19   8   Mr. McAlexander's presentation?

02:24:21   9   Q.   (By Mr. Lambrianakos)   Do you see the Court's

02:24:26 10   construction of adaptive beamforming?

02:24:28 11   A.   Yes, sir, I see that.

02:24:30 12   Q.   Can you point out where the words "filter coefficients"

02:24:36 13   appear in this construction?

02:24:37 14   A.   Nowhere.

02:24:38 15   Q.   How about "beamformer weights," is that in there?

02:24:43 16   A.   No, sir.

02:24:47 17   MR. LAMBRIANAKOS: Now, if we could turn to the

02:24:50 18   page ending in 6042 of PTX-334.   If you could zoom in on

02:25:01 19   the -- the middle diagram.   Thank you.

02:25:05 20   Q.   (By Mr. Lambrianakos)   You see in this diagram you have

02:25:12 21   seven-microphone circular array on the left-hand side?

02:25:15 22   A.   Yes, I see that.

02:25:16 23   Q.   Then there are several boxes until you reach FBF, which

02:25:21 24   is the fixed beamformer, right?

02:25:24 25   A.   Yes, there are three boxes before you go to FBF.

02:25:28   1   Q.   But, finally, you get to FBF, and 12 beams are output

02:25:32   2   from the FBF, correct?

02:25:34   3   A.   Yes, sir, that's correct.

02:25:40   4   Q.   And then those 12 beams are fed into the ABF, correct?

02:25:45   5   A.   That is correct.

02:25:45   6   Q.   And that's the adaptive beamformer, isn't it?

02:25:49   7   A.   That is the adaptive beamformer that Mr. Phil also

02:25:53   8   explained this morning.

02:25:53   9   Q.   And that beamformer outputs 12 beams, doesn't it?

02:25:57 10   A.   Yes, sir, it outputs 12 beams.

02:26:02 11   Q.   Now, you've reviewed all the deposition testimony in

02:26:08 12   this case, right?

02:26:09 13   A.   Yes, I have.   There may have been some depositions I

02:26:14 14   have not reviewed, but I believe I've done the ones that

02:26:19 15   were provided to me and are in my report.

02:26:20 16   Q.   You, specifically, did refer to Mr. Hilmes's deposition

02:26:23 17   in your expert report, right?

02:26:26 18   A.   Yes.   I believe I did that, yes.

02:26:30 19   Q.   You referred to many sections of that report -- of that

02:26:33 20   deposition, as a matter of fact, in your report, right?

02:26:35 21   A.   Yes, I did.   Yeah.

02:26:38 22   Q.   And do you recall when Mr. Hilmes testified about the

02:26:44 23   adaptive beamforming unit in the MPAF?   Do you remember

02:26:49 24   that testimony?

02:26:50 25   A.   Excuse me for interrupting you.

02:26:51	1	Q. Sorry. Go ahead.
02:26:52	2	A. During his deposition?
02:26:54	3	Q. Yes.
02:26:55	4	A. I don't exactly recall. There were hundreds of
02:26:58	5	documents I reviewed. But if you don't mind, show it to
02:27:02	6	me.
02:27:03	7	Q. Do you recall when he was asked this question and gave
02:27:07	8	this answer: But coefficients in other blocks, like the
02:27:14	9	adaptive beamforming, output of the beam selector, those
02:27:17	10	things change, and some of them change continuously, right?
02:27:20	11	And Mr. Hilmes said: The adaptive beamforming
02:27:23	12	block has filter coefficients that can change.
02:27:27	13	Do you remember that?
02:27:28	14	A. Do you mind putting that page on there because I don't
02:27:32	15	see it?
02:27:33	16	Q. I believe in your binder you have it, and we'll put it
02:27:38	17	up on the screen.
02:27:40	18	MR. LAMBRIANAKOS: Page 73 of -- well, let's go to
02:27:42	19	Page 287 of the transcript. Sorry. If we look at the top,
02:27:53	20	it's the first 11 lines or so.
02:28:03	21	Q. (By Mr. Lambrianakos) You see when counsel asked a
02:28:05	22	question about the adaptive beamforming block in the MPAF,
02:28:11	23	Mr. Hilmes admitted that the adaptive beamformer has filter
02:28:16	24	coefficients that can change? Do you see that?
02:28:16	25	A. Yes, I can see what he said there. Yes.

02:28:18   1   Q.   And it was your position that adaptive beamforming

02:28:21   2   requires that filter coefficients change, correct?

02:28:24   3   A.   Can you please repeat the question?

02:28:28   4   Q.   It is your understanding that to do adaptive

02:28:32   5   beamforming, according to the Court's construction, the

02:28:36   6   filter coefficients have to change, right?

02:28:37   7   A.   To perform adaptive beamforming based on the Court

02:28:42   8   construction, if you can put the Court construction there,

02:28:45   9   it has to have the ability to steer the beam in the

02:28:47 10   direction of the said sound source.

02:28:50 11   Q.   Yes, sir, no, sir, you said that in order to perform

02:28:54 12   adaptive beamforming, the filter coefficients have to

02:28:56 13   change?

02:28:56 14   A.   Yes.

02:29:00 15   Q.   Now, the Alexa system --

02:29:02 16   MR. LAMBRIANAKOS: You can take that down.

02:29:04 17   Q.   (By Mr. Lambrianakos)   The Alexa system is not accused

02:29:06 18   of infringement in this case, right?

02:29:07 19   A.   No, sir.

02:29:10 20   Q.   The AI of Alexa is not part of an Echo device, is it?

02:29:15 21   A.   No, sir.

02:29:15 22   Q.   Speech recognition is not part of the Echo device,

02:29:20 23   right?

02:29:20 24   A.   No, sir.

02:29:21 25   MR. LAMBRIANAKOS: Pass the witness.

02:29:22   1   THE COURT: Cross -- redirect, I'm sorry.

02:29:25   2   THE WITNESS: Thank you, sir.

02:29:27   3   MR. LAQUER: Yes, Your Honor.

02:29:45   4   THE COURT: Proceed when you're ready, Mr. Laquer.

02:29:45   5   REDIRECT EXAMINATION

02:29:48   6 BY MR. LAQUER:

02:29:48   7 Q. Dr. Kiaei, counsel for Plaintiffs asked you questions

02:29:52   8 about your work as an expert witness. Do you recall that?

02:29:54   9 A. Yes, sir.

02:29:55 10 Q. Have you ever testified in front of a jury before?

02:29:57 11 A. No, this is my first time.

02:29:59 12 Q. Do you recall Vocalife's expert, Mr. McAlexander,

02:30:02 13 identifying the number of times that he has testified as a

02:30:06 14 professional expert?

02:30:06 15 A. I don't remember the exact number, but it was -- he's

02:30:09 16 been in the court, I believe, several times.

02:30:12 17 Q. And you teach university classes on audio signal

02:30:18 18 processing, correct?

02:30:19 19 A. Yes, I've taught class on audio signal processing.

02:30:22 20 Q. Does any Echo device determine any delay between any

02:30:24 21 sound sensor and an origin?

02:30:24 22 A. No, it does not.

02:30:25 23 Q. And were all of your opinions where you referred to

02:30:29 24 calculating, equally applicable to determining?

02:30:33 25 A. Yes.

02:30:35 1 Q.   Counsel asked you questions about whether or not

02:30:38 2 something is in real-time. Do you recall that?

02:30:40 3 A.   Yes, I do.

02:30:41 4 Q.   Now, Claim 1 of the patent requires receiving a target

02:30:48 5 sound signal, correct?

02:30:49 6 A.   Yes.

02:30:49 7 Q.   And it also requires enabling beamforming based on a

02:30:55 8 determination of a delay, correct?

02:30:58 9 A.   That's correct.

02:30:58 10 Q.   And that determination of a delay has to be based on

02:31:02 11 the target sound signal that was received, correct?

02:31:05 12 A.   That is correct.

02:31:06 13 Q.   Is it possible to enable beamforming on sound before

02:31:09 14 that sound ever exists?

02:31:11 15   MR. LAMBRIANAKOS: Objection, leading.

02:31:12 16   THE COURT: Sustained.

02:31:15 17 Q.   (By Mr. Laquer) Dr. Kiaei, could you explain what you

02:31:18 18 were referring to when you used the terminology

02:31:21 19 "real-time"?

02:31:21 20 A.   The calculation of the delay, tau, requires to know the

02:31:28 21 azimuth angle between the said target sound source and the

02:31:31 22 axis, the azimuth angle.

02:31:34 23   From that, you need -- so you need to know where

02:31:36 24 the target sound source is. And if there is no target

02:31:40 25 sound source, no speaker around, then you won't be able to

02:31:43   1   calculate tau, which is the delay. And then from delay,

02:31:45   2   you form the beams.

02:31:46   3   So this is what I was referring to.

02:31:51   4   Q. Does the '049 patent specification describe beamformer

02:31:56   5   coefficients?

02:31:57   6   A. Yes, it does. It actually has the equations that says

02:32:03   7   how the beams are.

02:32:04   8   Q. And do you recall -- are beamformer coefficients

02:32:08   9   necessary in your experience in the industry to form a

02:32:11 10   beam?

02:32:12 11   A. That is the definition of how the beam is. Yes, you

02:32:16 12   need those.

02:32:17 13   Q. Have you ever heard of any beam in any audio processing

02:32:21 14   system that is formed without coefficients?

02:32:23 15   A. Related to this topic? No.

02:32:25 16   Q. Now, have you reviewed internal Amazon documents

02:32:43 17   regarding the type of processors that Amazon uses?

02:32:46 18   A. Yes, I have.

02:32:47 19   Q. And can you explain what you understand Amazon's belief

02:32:53 20   to have been regarding whether or not the devices use a

02:32:56 21   DSP?

02:32:58 22   A. Yes, I do. As a matter of fact, Amazon have gone

02:33:02 23   through the process of deciding -- when they decided for

02:33:06 24   MediaTek and for the Intel Neon process what to do, and

02:33:12 25   they decided to stay away from DSP, or digital signal

02:33:15   1   processor, because of the complexity and cost and many

02:33:18   2   other things, and they decided to choose the MediaTek and

02:33:21   3   the Neon Intel processor because they are not a DSP,

02:33:26   4   digital signal processor. And those are also --

02:33:30   5   Q. Based on your review of Amazon's documents, are you

02:33:32   6   confident that Amazon has always believed that its products

02:33:35   7   that have been released after April of 2016 do not use

02:33:40   8   DSPs?

02:33:40   9   A. Yes, absolutely, sir.

02:33:42   10   Q. Do you understand that Vocalife is accusing Amazon of

02:33:46   11   indirectly infringing the '049 patent in this case?

02:33:50   12   A. Yes, I do.

02:33:51   13   Q. Do you have any understanding as to whether or not that

02:33:55   14   requires Amazon to have any subjective belief regarding its

02:34:00   15   actions?

02:34:00   16   MR. LAMBRIANAKOS: Objection, Your Honor. This

02:34:02   17   goes beyond the scope of the cross. Furthermore, Your

02:34:08   18   Honor, it's not in his report.

02:34:11   19   THE COURT: Do you have a response, counsel?

02:34:14   20   MR. LAQUER: Counsel for Vocalife was raising

02:34:17   21   digital signal processors. This is important for --

02:34:20   22   THE COURT: I'm not concerned about the Rule 411

02:34:24   23   objection. I'm concerned about whether it's outside the

02:34:26   24   scope of his report.

02:34:28   25   MR. LAQUER: His report disagreed with all of the

02:34:31   1   positions taken in Mr. McAlexander's, and those included

02:34:35   2   Mr. McAlexander's opinions regarding indirect infringement.

02:34:38   3   THE COURT: Is it your position that his report

02:34:41   4   purports to offer and give an opinion as to the mindset of

02:34:48   5   Amazon, as your question called for?   Yes or no?

02:34:56   6   MR. LAQUER: I'll withdraw the question,

02:34:58   7   Your Honor.

02:34:58   8   THE COURT: Let's move on.

02:35:00   9   Q.   (By Mr. Laquer)   Have you heard anyone from Vocalife

02:35:03 10   deny the fact that Echo's beams just don't move?

02:35:07 11   A.   No.

02:35:08 12   Q.   Does that seem to even be a fact that's in dispute in

02:35:11 13   this case?

02:35:11 14   A.   No.

02:35:12 15   Q.   You were asked questions about a fixed beamformer and

02:35:17 16   whether some behavior is limited to a fixed beamformer.   Do

02:35:20 17   you recall that?

02:35:21 18   A.   Yes.

02:35:22 19   Q.   Now, do you use the term "fixed beamformer" to refer to

02:35:27 20   Echo's entire beamforming process?

02:35:30 21   A.   Yes.

02:35:30 22   Q.   And you were also asked about the term "adaptive

02:35:36 23   beamformer."   Do you recall that?

02:35:37 24   A.   Yes, sir.

02:35:38 25   Q.   And do you know whether the -- any description of any

02:35:44 1 adaptive beamformer in any Echo device is described as

02:35:48 2 actually steering a beam?

02:35:49 3 A.   No, it does not.   That actuates noise reduction.

02:35:54 4 Q.   But the adaptive beamformer in Claim 1 of the '049

02:35:58 5 patent, under the Court's construction, does that require

02:36:01 6 steering?

02:36:02 7 A.   Yes, it does.

02:36:04 8 Q.   Or at least the ability to steer, correct?

02:36:06 9 A.   Yes, the ability to steer in the direction of the said

02:36:14 10 sound signal.

02:36:15 11 Q.   Did anything that Mr. Lambrianakos asked you in any way

02:36:20 12 affect your testimony that you gave when I was taking your

02:36:24 13 direct examination?

02:36:25 14 A.   No.

02:36:27 15 Q.   And did anything that Mr. Lambrianakos asked you in any

02:36:30 16 way affect your opinion that Amazon's Echo devices, when

02:36:36 17 used, do not infringe any claim asserted here from the '049

02:36:42 18 patent?

02:36:42 19 A.   No.

02:36:43 20   MR. LAQUER: I pass the witness.

02:36:44 21   THE COURT: Further cross-examination?

02:36:46 22   MR. LAMBRIANAKOS: No further cross, Your Honor.

02:36:47 23   THE COURT: All right.   You may step down,

02:36:49 24 Dr. Kiaei.

02:36:50 25   THE WITNESS: Thank you, sir.   Thank you,

02:36:52	1	Your Honor.
02:36:52	2	THE COURT: Is there a desire that this witness be
02:36:59	3	excused?
02:37:00	4	MR. DACUS: Yes, Your Honor, may he be excused?
02:37:02	5	Thank you for asking.
02:37:04	6	THE COURT: Is there any objection?
02:37:05	7	MR. LAMBRIANAKOS: No, Your Honor, no objection.
02:37:06	8	THE COURT: All right. Doctor, you're excused.
02:37:09	9	That means you're free to stay with us. You're also free
02:37:13	10	to leave. It's your choice.
02:37:14	11	THE WITNESS: Thank you, Your Honor.
02:37:15	12	THE COURT: All right. Ladies and gentlemen,
02:37:16	13	before Defendant calls their next witness, we're going to
02:37:19	14	take a short recess.
02:37:21	15	If you'll leave your notebooks in your chairs,
02:37:23	16	follow all my instructions, and we'll be back in here
02:37:26	17	shortly to continue.
02:37:30	18	The jury is excused for recess at this time.
02:37:34	19	COURT SECURITY OFFICER: All rise.
02:37:34	20	(Jury out.)
02:37:35	21	THE COURT: The Court stands in recess.
02:59:31	22	(Recess.)
02:59:39	23	(Jury out.)
02:59:39	24	COURT SECURITY OFFICER: All rise.
02:59:40	25	THE COURT: Be seated, please.

03:02:19   1   Defendants, are you prepared to call your next

03:02:28   2   witness?

03:02:28   3   MR. RE: We are, Your Honor.

03:02:29   4   THE COURT: And who do you intend to call, Mr. Re?

03:02:32   5   MR. RE: Dr. Richard Stern.

03:02:34   6   THE COURT: All right. Let's bring in the jury,

03:02:35   7   please.

03:02:35   8   COURT SECURITY OFFICER: All rise.

03:02:36   9   THE COURT: If there are binders to distribute,

03:02:38 10   let's do that now.

03:03:04 11   (Jury in.)

03:03:06 12   THE COURT: Please be seated, ladies and

03:03:09 13   gentlemen.

03:03:09 14   Defendants, call your next witness, please.

03:03:15 15   MR. RE: Thank you, Your Honor.

03:03:15 16   The Defendants call as our next -- next witness,

03:03:19 17   Dr. Richard Stern.

03:03:20 18   THE COURT: Dr. Stern, if you'll come forward and

03:03:22 19   be sworn, please.

03:03:25 20   (Witness sworn.)

03:03:26 21   THE COURT: Please come around, sir, have a seat

03:03:41 22   at the witness stand.

03:03:41 23   RICHARD M. STERN, JR., Ph.D., DEFENDANTS' WITNESS, SWORN

03:03:41 24   DIRECT EXAMINATION

03:04:13 25   BY MR. RE:

03:04:13   1   Q.   Doctor, could you state your full name for the record,

03:04:19   2   please.

03:04:19   3   THE COURT: Just a minute, Mr. Re.

03:04:22   4   Is the witness going to pour some water?

03:04:26   5   THE WITNESS: I am.

03:04:27   6   THE COURT: Let's do that, get that done.   If

03:04:27   7   you're going to spill it, I'd rather know about it at the

03:04:30   8   beginning of the examination.

03:04:33   9   THE WITNESS: I'll do my best.   Thank you.

03:04:36   10   THE COURT: All right.   Now let's proceed.

03:04:37   11   MR. RE: Thank you, Your Honor.

03:04:38   12   Q.   (By Mr. Re)   Dr. Stern, please state your full name for

03:04:41   13   the record, please.

03:04:42   14   A.   Richard Stern.

03:04:43   15   Q.   And what is your profession, Dr. Stern?

03:04:46   16   A.   I am a professor of electrical engineering at

03:04:52   17   Carnegie-Mellon University.

03:04:52   18   Q.   And where is Carnegie-Mellon?

03:04:54   19   A.   In Pittsburgh, Pennsylvania.

03:04:56   20   Q.   And how did you become involved in this case?

03:04:58   21   A.   I was asked by Amazon to review the '049 patent and

03:05:03   22   related material and comment on the validity of the patent.

03:05:08   23   Q.   Okay.   And can you describe your educational background

03:05:13   24   for the jury, please?

03:05:14   25   A.   Yes.   I graduated from the Massachusetts Institute of

03:05:18 1 Technology, that's MIT, in 1970 with a Bachelor's in

03:05:24 2 Electrical Engineering and Computer Science.

03:05:26 3   I had a -- I then went to California, received a

03:05:31 4 Master's in Electrical Engineering from University of

03:05:35 5 California Berkeley.

03:05:35 6   Then I returned to MIT, where I worked on the rest

03:05:42 7 of my graduate work, worked on my doctoral research, and

03:05:46 8 finished my work for the Ph.D. in December 1976 and

03:05:50 9 receiving the degree in 1977.

03:05:52 10 Q.   And did you prepare a thesis to get your doctorate?

03:05:55 11 A.   Yes, yes, yes.

03:05:56 12 Q.   And what exactly was your doctoral thesis on?

03:05:59 13 A.   Well, believe it or not, it was on sound source

03:06:04 14 localization as practiced by humans.

03:06:05 15 Q.   Okay. What year did you complete your thesis?

03:06:07 16 A.   I finished in December of '76.

03:06:10 17 Q.   And have you been a professor ever since?

03:06:12 18 A.   Well, ever since. I started in January '77, and I've

03:06:17 19 been at Carnegie-Mellon ever since.

03:06:19 20 Q.   And what are some of the classes that you teach at

03:06:22 21 Carnegie-Mellon University?

03:06:22 22 A.   I've done a number of things, communications, I've

03:06:26 23 taught acoustics. But over the last several decades, I've

03:06:30 24 been responsible for the signal processing sequence. There

03:06:33 25 are three courses in the sequence. Currently I'm teaching

03:06:36 1   the third of them, and it includes topics of adaptive

03:06:42 2   signal processing, adaptive arrays, noise reduction, sound

03:06:45 3   source localization.

03:06:45 4   Q.   And what do you focus your -- do you -- do you -- do

03:06:50 5   you do any research?

03:06:51 6   A.   Yes, we do.

03:06:52 7   Q.   And what is your research on?

03:06:54 8   A.   I continued to work on auditory perception, but most of

03:07:01 9   my work is signal processing for speech recognition and

03:07:04 10   related technologies. My group develops algorithms that

03:07:09 11   enable speech recognition systems to maintain good

03:07:11 12   performance in difficult acoustical environments, such as

03:07:15 13   noise, reverberation, et cetera.

03:07:17 14   Q.   And have you received any honors or awards for your

03:07:20 15   work?

03:07:20 16   A.   Well, there have been a number. For example, I'm a

03:07:23 17   fellow of the Institute of Electrical and Electronics

03:07:27 18   Engineers, that's the IEEE. That's the major professional

03:07:30 19   society for electrical engineers.

03:07:33 20   I'm also a fellow of the International Speech

03:07:39 21   Communication Association and the Acoustical Society of

03:07:41 22   America.

03:07:41 23   I'm one of very few individuals who are fellows in

03:07:45 24   those three societies.

03:07:46 25   Q.   And have you published papers in these fields?

03:07:49	1	A. Yes, large numbers of papers.
03:07:50	2	Q. And I noticed you created some slides, and I'm going to
03:07:53	3	show you one.
03:07:54	4	Why did you select these two to put on a slide?
03:07:57	5	A. Well, these are two of the papers that we -- my group
03:08:00	6	has published before the invention that led to the -- the
03:08:08	7	'049 patent.
03:08:08	8	The paper on the left is on subband
03:08:13	9	likelihood-maximizing beamforming for speech recognition in
03:08:18	10	reverberant environments. And that was from I'd say
03:08:21	11	2007-2008. Can't read the fine print.
03:08:22	12	The paper on the right-hand side was a conference
03:08:24	13	paper. It was -- I was an invited keynote speaker for the
03:08:28	14	microphone array workshop that's run annually by the Signal
03:08:32	15	Processing Society of the IEEE. This particular one I
03:08:35	16	think was in 2008 in Taranto, Italy.
03:08:39	17	Q. So do you have experience working with microphone
03:08:42	18	arrays?
03:08:42	19	A. Yes.
03:08:43	20	Q. Tell me about that.
03:08:45	21	A. Well, we use microphone arrays extensively for a number
03:08:51	22	of things that we do. It's not the only technology.
03:08:54	23	THE COURT: Dr. Stern, would you slow down just a
03:08:58	24	little, please.
03:08:58	25	THE WITNESS: Of course. I'm sorry, Your Honor.

03:08:58   1   THE COURT: That's all right. Continue.

03:09:00   2   A.   Yes, we use microphone arrays, among other

03:09:04   3   technologies, in our work in improving speech recognition

03:09:07   4   accuracy.

03:09:08   5   Q.   (By Mr. Re) And you mentioned that your doctorate

03:09:12   6   dealt with sound source localization. Do you have

03:09:13   7   experience with that, as well?

03:09:15   8   A.   Yes. In both by humans and by machines.

03:09:18   9   Q.   And how about do you have any experience with adaptive

03:09:22   10 beamforming?

03:09:22   11 A.   Yes. That's enabling technology for many of the things

03:09:27   12 that we do to improve signals in noisy environments.

03:09:32   13 Q.   And have you ever served as an expert of any kind for

03:09:37   14 my client, Amazon, before this case?

03:09:39   15 A.   No.

03:09:39   16 Q.   And do you have any financial interest whatsoever in

03:09:41   17 the outcome of this litigation?

03:09:43   18 A.   No.

03:09:43   19 Q.   And are you being paid for your time to assist us in

03:09:46   20 this case?

03:09:46   21 A.   Yes, I am.

03:09:47   22 Q.   At what rate?

03:09:48   23 A. $500.00 per hour.

03:09:53   24   MR. RE: Your Honor, at this time Amazon offers

03:09:55   25 Dr. Stern as an expert in the fields of audio signal

03:10:00 1 processing and microphone arrays.

03:10:03 2   THE COURT: Is there objection?

03:10:04 3   MR. RUBINO: No objection, Your Honor.

03:10:05 4   THE COURT: Then, without objection, the Court

03:10:07 5 will recognize this witness as an expert in those

03:10:10 6 designated fields.

03:10:10 7   Please continue.

03:10:12 8 Q. (By Mr. Re) Just very briefly, tell me what was your

03:10:14 9 assignment in this case?

03:10:14 10 A. Well, as I mentioned earlier, I was asked to provide

03:10:18 11 opinions about the validity of the '049 patent.

03:10:21 12 Q. And what did you have -- briefly, what did you have to

03:10:24 13 look at, in order to determine the validity of the '049

03:10:30 14 patent?

03:10:30 15 A. Well, I looked at the patent itself, I looked at the

03:10:35 16 file history for the patent, I looked at multiple sources

03:10:39 17 of prior art, and those were the primary references.

03:10:44 18 Q. Let me just slow down just for a moment. I want to

03:10:47 19 explore what you mean by the phrase "prior art."

03:10:50 20   What exactly do you mean by prior art?

03:10:54 21 A. Could you move that to the right so I can see it

03:11:08 22 better? I assume that you want me to see it.

03:11:13 23 Q. How is that?

03:11:15 24   THE COURT: Mr. Re, why don't you move it out to

03:11:18 25 the front edge of the podium. That way not only the

03:11:21 1 witness but the jury can probably see it.

03:11:23 2   And -- and you'll need to turn it more so that the

03:11:29 3 witness can see it.

03:11:30 4   THE WITNESS: Yeah, that's great.

03:11:32 5   THE COURT: And, Dr. Stern, you have leave to

03:11:33 6 stand if you need to, if there's any part of it, as he

03:11:36 7 might write toward the bottom, that you need to see.

03:11:39 8   THE WITNESS: Thank you. Thank you very much.

03:11:40 9   THE COURT: All right. Let's continue.

03:11:41 10 Q. (By Mr. Re) Okay. Prior art, am I saying it right?

03:11:45 11 A. Yes.

03:11:45 12 Q. So I understand that -- the patent issued in what year;

03:11:49 13 do you remember?

03:11:49 14 A. September 24th -- no, the patent issued in 2018.

03:11:57 15 Q. Now, does prior art bear any relationship to the issue

03:12:02 16 date of the patent?

03:12:03 17 A. No, no. By law, prior art is defined to be the art

03:12:10 18 that was published, disclosed, or otherwise available at

03:12:14 19 the time of the invention itself, which corresponds to the

03:12:20 20 filing date of the patent.

03:12:22 21 Q. Do you remember the year the application was filed?

03:12:30 22 A. Yes, it was September 24th, 2010.

03:12:34 23 Q. So are you looking at any information that may have

03:12:40 24 occurred or published in this period?

03:12:42 25 A. Anything that happened after 2010 is irrelevant to my

03:12:47   1   testimony.

03:12:48   2   Q.   Including the 2011 meeting, that would have no bearing,

03:12:51   3   right?

03:12:51   4   A.   Nothing to do with my testimony.

03:12:53   5   Q.   And does prior art vary depending who the litigants are

03:12:57   6   and whether they've met each other before?

03:12:59   7   A.   No.

03:12:59   8   Q.   And how far back do you have to go in order to use

03:13:02   9   something as prior art?

03:13:05   10   A.   It just has to have been disclosed or published at the

03:13:10   11   time the invention was filed, 2010.

03:13:12   12   Q.   And the invention you said was 2010, is what you're

03:13:15   13   using?

03:13:15   14   A.   2010.

03:13:16   15   Q.   And so is everything we're discussing earlier than

03:13:19   16   2010?

03:13:20   17   A.   Everything we are discussing is much earlier than 2010.

03:13:24   18   Q.   Way more than a year?

03:13:25   19   A.   More than a year.

03:13:27   20   Q.   Okay.   And when you're looking at this prior art, for

03:13:35   21   what purpose are you reading the prior art?

03:13:39   22   A.   The reason why the prior art is important is very

03:13:43   23   simple.   According to the law, a claim of a patent is

03:13:48   24   invalid if a person of ordinary skill of the art would find

03:13:54   25   the material of the claim obvious, given the prior art as

| 03:14:00 | 1 | of the filing -- as of the time of the invention. |

03:14:00   1   of the filing -- as of the time of the invention.

03:14:03   2   Q.   And does the law require that any individual actually

03:14:07   3   possess -- physically possess all the prior art?

03:14:10   4   A.   No.

03:14:10   5   Q.   What does the law do with respect to somebody of

03:14:14   6   ordinary skill in the art?

03:14:17   7   A.   The person of the ord -- a person of ordinary skill in

03:14:22   8   the art, and this is a term of art, is presumed to be aware

03:14:26   9   of all of the prior art at the time of the invention.

03:14:31   10   Q.   So it doesn't matter where it's published, for example?

03:14:35   11   A.   No.

03:14:35   12   Q.   It could be a foreign piece of prior art, for example?

03:14:38   13   A.   Absolutely.

03:14:39   14   Q.   Now, tell me exactly, when you say a person of ordinary

03:14:50   15   skill in the art, who exactly is that?

03:14:53   16   A.   Well, this is a hypothetical person. And we have a

03:14:57   17   definition for that. And we agree with the construction

03:15:01   18   that had been proposed. And that hypothetical person is

03:15:07   19   presumed to have all of the art that is in the public at

03:15:15   20   his or her disposal.

03:15:17   21   Q.   Very good. When you say we agree with the construction

03:15:19   22   that's been proposed, what exactly did you mean by that

03:15:23   23   statement? It was a little unclear.

03:15:26   24   A.   Well, the other side proposed that a person of ordinary

03:15:29   25   skill in the art for this particular discussion would be

03:15:33 1 somebody who either had a Bachelor's in Electrical

03:15:37 2 Engineering, Computer Science, plus three or so years of

03:15:40 3 relevant industry experience, or a person with a Master's

03:15:43 4 degree in Electrical Engineering, Computer Science from a

03:15:46 5 relevant discipline.

03:15:47 6 Q.   And so --

03:15:48 7 A.   We agree with that.

03:15:49 8 Q.   Okay. With Mr. McAlexander's definition?

03:15:51 9 A.   That's correct.

03:15:52 10 Q.   Okay. And what exactly was the state of the art

03:15:58 11 concerning microphone arrays right before the time of the

03:16:01 12 filing of this application?

03:16:03 13 A.   Well, by early 2010, there had already been a great

03:16:08 14 deal -- there had been a great deal of work already done in

03:16:11 15 microphone arrays. We've been -- in our own group, we've

03:16:15 16 been doing it since the late '80s and going to meetings

03:16:19 17 regularly since the mid-'90s.

03:16:21 18   Many -- all of the technologies that have been

03:16:24 19 disclosed in the '049 patent were already out there in the

03:16:28 20 art, both individually and also used in combination.

03:16:31 21 Q.   And have you been here for the entirety of this trial?

03:16:34 22 A.   Yes, I have.

03:16:35 23 Q.   And were you here when Dr. Li was the first witness --

03:16:40 24 talking with me as the first witness of this trial?

03:16:41 25 A.   Yes, I was.

03:16:43   1   Q.   And do you remember when Dr. Li and I were going

03:16:46   2   through his core technologies in the document that he sent

03:16:51   3   Amazon back in 2011?

03:16:53   4   A.   Yes, yes, yes.

03:16:55   5   Q.   And do you remember when I was writing down and taking

03:16:59   6   notes during Dr. Li's testimony?

03:17:02   7   A.   Yes.

03:17:02   8   Q.   And do you agree with the statements that I've written

03:17:07   9   on the board in response to Dr. Li's testimony?

03:17:09   10 A.   Yes, I do.

03:17:10   11 Q.   And so you agree that microphone arrays were well-known

03:17:14   12 by September of 2010, right?

03:17:16   13 A.   Yes, they were.

03:17:17   14 Q.   In any configuration, linear or circular, right?

03:17:20   15 A.   That is correct.

03:17:20   16 Q.   And in these microphone array systems, you agree that

03:17:24   17 it was well-known to include noise reduction algorithms,

03:17:28   18 echo cancellation, right?

03:17:29   19 A.   Those were commonly done.

03:17:30   20   MR. RUBINO: Objection.   Objection.

03:17:31   21   THE COURT: State your objection.

03:17:33   22   MR. RUBINO: Leading, Your Honor.

03:17:34   23   THE COURT: Sustained.

03:17:35   24 Q.   (By Mr. Re)   Would you kindly go through this board and

03:17:38   25 express your opinion as to the accuracy of this board that

03:17:43   1   I constructed with Dr. Li?

03:17:46   2   THE COURT: And, Mr. Re, if you'd make sure that

03:17:50   3   the witness has finished the answer before you start the

03:17:52   4   next question.

03:17:53   5   MR. RE: I shall.

03:17:54   6   THE COURT: Just a little -- just a little break

03:17:56   7   between the questions and the answers would be helpful.

03:17:58   8   MR. RE: I'm sorry, Your Honor.

03:17:59   9   THE COURT: All right. Please proceed, Dr. Stern.

03:18:00 10   A.   Looking at the core technologies listed on the board, I

03:18:06 11   see microphone arrays in multiple configurations, noise

03:18:11 12   reduction, echo cancellation, sound source localization,

03:18:16 13   adaptive beamforming, and digital signal processing, all of

03:18:21 14   these were disclosed in the public art, published widely,

03:18:27 15   discussed. They existed at the time of the invention. I

03:18:29 16   agree with Dr. Li in that respect.

03:18:42 17   Q.   (By Mr. Re) Let's talk a minute about digital signal

03:18:48 18   processors. How do you know for sure that digital signal

03:18:50 19   processors were well-known in the art well before 2010?

03:18:52 20   A.   Well, there were many publications of them --

03:18:57 21   presentations by Texas Instruments, Motorola, trade

03:19:01 22   magazine -- trade -- at trade meetings and so forth.

03:19:06 23   As an example, what you see on the screen is an

03:19:09 24   article from Computerworld from March 2001. The title --

03:19:15 25   Computerworld is a major trade magazine in the computer

03:19:19   1   industry. And this is an article about Digital Signal

03:19:25   2   Processors, and you can see the text states -- that's the

03:19:27   3   part that's circled in red -- DSPs are widely used for

03:19:30   4   processing audio, and a bunch of other stuff.

03:19:31   5   Q.   Now, let's go back to the circular array. And were

03:19:37   6   circular arrays well-known well before 2010?

03:19:39   7   A.   Yes, they were.

03:19:40   8   Q.   And you -- and you prepared a slide. I wonder if you

03:19:47   9   can just briefly describe what is shown on this Slide 6.5?

03:19:52 10   A.   This is a slide depicting a circular microphone array.

03:19:57 11   It is a figure in a paper by an author I'll refer to as

03:20:03 12   Dmochowski. It was published in the IEEE Transactions on

03:20:05 13   Audio in spring of 2007.

03:20:08 14   And we'll be talking about it a little bit later,

03:20:11 15   but you can see that the microphones are configured in a

03:20:14 16   circular array in 2007.

03:20:15 17   Q.   Okay. Now, let's move on.

03:20:18 18   What claims are at issue in this case?

03:20:20 19   A.   Claim 1 and Claim 8.

03:20:23 20   Q.   And have you formed an opinion about the validity or

03:20:26 21   invalidity of Claims 1 and 8?

03:20:29 22   A.   Yes, I have.

03:20:30 23   Q.   And what is your opinion?

03:20:34 24   A.   My opinion is that the claims -- Claims 1 and Claim 8

03:20:38 25   are invalid.

03:20:40   1   Q. Why do you believe that Claims 1 and 8 are invalid?

03:20:44   2   A. Well, this part of the case is very simple. The law

03:20:49   3   dictates that a claim in a patent is invalid if a person of

03:20:54   4   ordinary skill in the art would have found the text, the

03:20:59   5   teachings, the description of the claim obvious based on

03:21:03   6   the prior art that was available at the time of invention.

03:21:09   7   Q. Okay.

03:21:11   8   MR. RE: Your Honor, if I may approach to hand the

03:21:14   9   witness a physical item?

03:21:16   10   THE COURT: You may approach the witness.

03:21:18   11   Q. (By Mr. Re) I'm going to hand you what's been marked

03:21:20   12   Defendants' Exhibit 49P.

03:21:26   13   THE WITNESS: Thank you.

03:21:28   14   MR. RE: Mr. Berk, if you can call up Exhibit 49.

03:21:33   15   Q. (By Mr. Re) Could you identify for the record what I

03:21:38   16   just handed to you as Defendants' Exhibit 49P?

03:21:43   17   A. Yes. This is my copy -- my personal copy of the

03:21:47   18   Brandstein reference.

03:21:49   19   Q. And we know it's your personal copy --

03:21:52   20   A. Well, I checked and my name is inside.

03:21:55   21   Q. And that, in fact, if you look on your screen, is the

03:21:57   22   book. Is that your handwriting?

03:22:00   23   A. It is.

03:22:01   24   Q. When did you first obtain a copy of Dr. Brandstein's

03:22:07   25   book on Microphone Arrays?

03:22:09   1   A.   I purchased that copy of the book some time between

03:22:14   2   2001 and 2003, and I've had it in my possession continually

03:22:18   3   ever since.

03:22:18   4   Q.   And is the Brandstein textbook well-known in the

03:22:25   5   industry?

03:22:25   6   A.   Yes.   Even 20 years later, it remains perhaps the best

03:22:32   7   known book on microphone arrays in the industry.

03:22:33   8   Q.   And can you explain briefly how that book is organized?

03:22:37   9   A.   So the book is a collection of chapters written by

03:22:43 10   different specialists in different subportions of the

03:22:46 11   field.

03:22:46 12   But the important thing about this book is it was

03:22:51 13   curated by the authors -- I'm sorry, by the editors,

03:22:55 14   Brandstein and Ward, to provide a unified whole.   It's a

03:23:01 15   single production.   We look at -- we look at all the

03:23:03 16   chapters interchangeably, and we can rely on the editor's

03:23:07 17   statement in the preference -- in preface: In putting this

03:23:13 18   book together, our goal was to provide for the first time a

03:23:16 19   single -- a single, complete reference on microphone

03:23:20 20   arrays.   It's a single reference.

03:23:22 21   Q.   And do you use this textbook in your own research and

03:23:26 22   scholarship?

03:23:29 23   A.   Regularly and frequently, all parts of it.

03:23:31 24   Q.   I'd now like to take the ladies and gentlemen of the

03:23:33 25   jury through your analysis of Claim 1.

03:23:35   1   And I understand you have prepared some slides to

03:23:38   2   assist your explanation; is that right?

03:23:40   3   A.   That's correct.

03:23:48   4   So --

03:23:49   5   Q.   There's no question yet.

03:23:54   6   A.   No question. Sorry.

03:23:55   7   Q.   I want to take you to the introductory language of

03:23:55   8   Claim 1 that's highlighted on the screen. Do you see that?

03:23:55   9   A.   I do.

03:24:04   10   Q.   And, in fact, I want to ask you: Does Brandstein teach

03:24:07   11   methods for enhancing a target sound signal from a

03:24:10   12   plurality of sound signals?

03:24:12   13   A.   Yes, he does.

03:24:13   14   Q.   And, first, tell me what do you mean by -- what does it

03:24:16   15   mean by the word "plurality"?

03:24:17   16   A.   A plurality means just simply more than one.

03:24:21   17   Q.   And how do you know that Dr. Stern fully discloses

03:24:29   18   methods for enhancing a target sound signal from a

03:24:32   19   plurality of sound signals?

03:24:34   20   A.   You mean Brandstein?

03:24:37   21   Q.   Oh, I'm sorry, Dr. Brandstein.

03:24:39   22   A.   Yes. Well, enhancement of target sound signals is the

03:24:46   23   major focus of the book, but you can see again in the

03:24:52   24   preface that the -- Part 1, which is the entire first part

03:24:56   25   of the book, concerns the problem of enhancing the speech

03:25:01   1   signal acquired from an array of microphones.

03:25:03   2   And you can see that text goes on to say: The

03:25:07   3   other secondary goal is to suppress the background noise,

03:25:09   4   interfering sources, and the effects of room reverberation.

03:25:15   5   Q. No question that the introductory language is --

03:25:18   6   A. No. It -- Brandstein --

03:25:20   7   THE COURT: Just -- just a minute. Let him finish

03:25:22   8   the question before you start with the answer, please.

03:25:25   9   Again, gentlemen, let's have a little bit of space

03:25:28 10   between questions and answers. That way the jury will

03:25:31 11   follow this testimony better. And that's why we're all

03:25:33 12   here, so the jury follows the testimony.

03:25:35 13   All right. Let's continue, Mr. Re.

03:25:37 14   Q. (By Mr. Re) Do you have any doubt that the Brandstein

03:25:39 15   textbook explains the method highlighted on my slide?

03:25:42 16   A. No, I do not.

03:25:44 17   Q. Let's go to the next group of words in Claim 1.

03:25:56 18   And does the Brandstein textbook teach, and I

03:25:59 19   quote, a microphone array system comprising an array of

03:26:04 20   sound sensors in a linear, circular, or other

03:26:07 21   configuration?

03:26:08 22   A. Yes, it does.

03:26:09 23   Q. And how do you know?

03:26:10 24   A. Well, for example, Figure 5.13, which we see here,

03:26:20 25   shows a microphone array. Those are the four dots

03:26:23 1 highlighted in yellow. They happen to be in a linear

03:26:27 2 configuration in this -- in this figure. And this is just

03:26:29 3 an example of an array of sound sensors. In this case, in

03:26:33 4 a linear configuration, but other configurations are found

03:26:37 5 elsewhere.

03:26:38 6   So Brandstein does teach providing a microphone

03:26:45 7 array system comprising an array of sound sensors

03:26:47 8 positioned in linear, circular, or other configuration.

03:26:50 9 Q. Thank you.

03:26:51 10   If we move to the next group of words: A sound

03:27:00 11 source localization unit. Does Dr. Brandstein's textbook

03:27:04 12 explain and teach that item?

03:27:05 13 A. Yes, it does.

03:27:06 14 Q. How do you know?

03:27:07 15 A. Well, among other places, all of Chapter 8 is concerned

03:27:12 16 with the localization of sound -- in this case, in

03:27:17 17 reverberant rooms. That's what's taught. So the text does

03:27:19 18 teach sound -- how to develop sound source localization

03:27:23 19 units.

03:27:24 20 Q. What exactly is a unit?

03:27:25 21 A. Well, a unit is fancy lawyer talk for a thing that does

03:27:33 22 sound source localization.

03:27:35 23 Q. And does Brandstein disclose things that do sound

03:27:39 24 source localization?

03:27:39 25 A. Yes, it does.

03:27:40 1 Q. How do you know?

03:27:46 2 A. Well, for example, in the section cited, we're looking

03:27:49 3 at descriptions of three different algorithms that

03:27:52 4 accomplish sound source localization.

03:27:53 5   The first is time delay of arrival. The second is

03:27:57 6 SRP for steered response power. And the third is steered

03:28:04 7 response power, SRP-PHAT. That's steered response power

03:28:07 8 using the phase transform, which, in fact, is the specific

03:28:13 9 method that's cited in the specification of the '049

03:28:14 10 patent.

03:28:14 11 Q. So each of those are different kinds of sound source

03:28:18 12 localization units?

03:28:18 13 A. Yes, they are. And, collectively, they demonstrate

03:28:22 14 that Brandstein discloses sound source localization units.

03:28:26 15 Q. Okay. Let's go to the next group of words. And the

03:28:34 16 next group of words is, and I quote, an adaptive

03:28:39 17 beamforming unit.

03:28:39 18   Does the Brandstein textbook disclose and teach an

03:28:43 19 adaptive beamforming unit?

03:28:44 20 A. Yes, it does.

03:28:45 21 Q. And how do you know?

03:28:46 22 A. Well, adaptive beamforming units are found in a number

03:28:51 23 of parts of the text. Here, for example, the beginning of

03:28:55 24 Section 5.2, we see a large discussion on adaptive

03:29:00 25 beamformers.

03:29:00	1	I read: A beamformer which adaptively forms its
03:29:04	2	directivity pattern is called an adaptive beamforming --
03:29:07	3	beamformer, rather, and it simultaneously performs beam
03:29:12	4	steering, which refers to pointing the beam in the
03:29:15	5	direction of interest, presumably the desired sound source,
03:29:20	6	and null steering, which means suppressing signals coming
03:29:25	7	from other directions.
03:29:26	8	So Brandstein does disclose the existence and the
03:29:30	9	utility of adaptive beamforming units.
03:29:32	10	Q. Let's move to the next group of words.
03:29:35	11	Does Brandstein disclose a noise reduction unit?
03:29:41	12	A. Yes, it does.
03:29:43	13	Q. And how do you know?
03:29:45	14	A. Well, again, noise reduction units are discussed in
03:29:49	15	multiple sections of the text, but an easy example is
03:29:55	16	Chapter 3, which, in its entirety, is developed -- is
03:29:59	17	devoted to post-filtering techniques. As we can see from
03:30:02	18	the abstract, in the context of microphone arrays, the term
03:30:05	19	post-filtering denotes the post-processing of the array
03:30:09	20	output by a single-channel noise suppression filter.
03:30:13	21	In this context, noise suppression filter refers
03:30:16	22	to something that reduces the level of noise, and hence,
03:30:19	23	Brandstein discloses the use of noise reduction units.
03:30:21	24	Q. Okay. I now want to ask you about the next group of
03:30:28	25	words.

03:30:30   1   Does Brandstein teach that the sound source

03:30:35   2   localization unit, adaptive beamforming unit, and the noise

03:30:39   3   reduction unit are integrated into a digital signal

03:30:43   4   processor, as set forth in the middle of [A] of Claim 1?

03:30:52   5   A.   Yes, it does.

03:30:54   6   Q.   And how do you know that?

03:30:55   7   A.   Well, there are multiple locations throughout the text

03:30:58   8   where DSPs are referred to. But, for example, in the

03:31:02   9   latter section, future directions in microphone array

03:31:07 10   processing which discusses implementation, applications, we

03:31:07 11   see really the casual -- we see the text.

03:31:11 12   Today we have affordable DSPs that allow us to

03:31:15 13   implement all but the most complex schemes cheaply in

03:31:21 14   digital signal processing technology in real-time.

03:31:23 15   So a person of ordinary skill in the art would

03:31:25 16   realize that the natural way to implement in an efficient

03:31:30 17   fashion sound source localization, the adaptive

03:31:34 18   beamforming, and the noise reduction would be through the

03:31:35 19   use of digital signal processors.

03:31:40 20   In fact, at that time, it would have been very

03:31:42 21   difficult to do all that without the DSP chips.

03:31:44 22   Q.   And, in fact, this is in the section of the book

03:31:50 23   entitled Lessons from the Past?

03:31:53 24   A.   No, Lessons from the Future.

03:31:59 25   Q.   No, 18.1; do you see that?

03:32:02   1   A.   Oh, Lessons from the Past, yes.   I have to read the

03:32:05   2   fine print.

03:32:06   3   Q.   So you're confident that those words are expressly

03:32:08   4   taught by Brandstein?

03:32:09   5   A.   Yes, yes, clearly they are.

03:32:11   6   Q.   Let's move on to the next group of words.   I want to

03:32:21   7   ask you, does Dr. Brandstein also teach or suggest that the

03:32:28   8   sound source localization unit, the adaptive beamforming

03:32:28   9   unit, and the noise reduction unit are in operative

03:32:44 10   communication with said array of sound sensors?

03:32:44 11   A.   Yes, it does.

03:32:46 12   Q.   You smiled.   Why is that?

03:32:48 13   A.   Well, this is an easy one.

03:32:49 14   Q.   Why is this an easy one?

03:32:50 15   A.   Let's take a look at the exemplary figure.

03:32:54 16   We see in the upper left-hand corner, those

03:32:56 17   circles are microphones.   Those are the microphones in the

03:32:59 18   microphone array.   The outputs of the microphone go into

03:33:03 19   the fixed beamformer, and then down below the blocking

03:33:06 20   matrix and the adaptive filter, they accomplish the

03:33:11 21   beamforming, beamsteering, and noise reduction in this

03:33:15 22   case.

03:33:16 23   And this really is a very simple clause.   What

03:33:18 24   operative communication means here is that the subsequent

03:33:21 25   blocks are connected to the microphone array.   And if they

03:33:27   1   weren't connected, the device simply wouldn't work. This

03:33:29   2   is very, very obvious, and just common sense.

03:33:32   3   Q. I'd like to move on to the next major step in Claim 1

03:33:42   4   of the '049 patent.

03:33:43   5   This is the step about receiving the sound

03:33:47   6   signals. Do you see that?

03:33:49   7   A. Yes.

03:33:49   8   Q. And I'll read it into the record.

03:33:51   9   Does Brandstein teach: Receiving said sound

03:33:56 10   signals from a plurality of disparate sound sources by said

03:34:02 11   sound sensors, wherein said received sound signals comprise

03:34:06 12   said target sound signal from a target sound source among

03:34:11 13   said disparate sound sources, and ambient noise signals.

03:34:24 14   Do you see that?

03:34:24 15   A. Yes, I do.

03:34:25 16   Q. All right. I see you've underlined some words. And

03:34:29 17   I'd like to ask you, how do you know whether Dr. Brandstein

03:34:33 18   teaches all the words of Step [B]?

03:34:37 19   A. Well, this is a lot of words, but it's -- it's really a

03:34:39 20   very simple concept. What Paragraph [B] is saying is that

03:34:44 21   your multiple sound sensors, that is the microphone array,

03:34:48 22   are receiving all the sounds that are coming in. And those

03:34:51 23   sounds include the sounds that you want to be attending to,

03:34:54 24   in this case the target source, which in the example on the

03:34:59 25   figure of 5.13 is the speech.

03:35:01   1   And also along with it you receive a bunch of

03:35:05   2   stuff that you don't want to be paying attention to,

03:35:08   3   interference, indicated as white noise here. It could be

03:35:11   4   the AC hum or the air conditioners that Mr. McAlexander

03:35:14   5   referred to in his own discussion. And the impact of the

03:35:19   6   reflective board is to create reverberate components, which

03:35:24   7   also degrades speech recognition accuracy.

03:35:26   8   In fact, nowadays that's even a more difficult

03:35:29   9   problem than the additive noise.

03:35:31 10   So what this figure teaches, along with many other

03:35:34 11   examples throughout the book, is that the microphones in

03:35:36 12   the array receive multiple sound sources, including some

03:35:42 13   that you want, speech in this case, and some that you don't

03:35:45 14   want, the noise and the reverberate components. Hence, the

03:35:50 15   book teaches the reception of those sound signals,

03:35:52 16   Paragraph [B].

03:35:52 17   Q. Let's move on to big Paragraph [C], the determining a

03:35:56 18   delay.

03:35:57 19   Now, I first want to ask you, is it clear to you

03:36:00 20   from reading this claim that Step [B] must come before

03:36:08 21   Step [C]?

03:36:09 22   A. Yes.

03:36:09 23   Q. How do you know?

03:36:11 24   A. As we've heard, we cannot determine the delay without

03:36:14 25   receiving the sound in the first place. [B] must come

03:36:16   1   before [C].

03:36:24   2   Q.   Now, does Dr. Brandstein's book teach this determining

03:36:29   3   a delay step, which is Step [6] shown on the slide?

03:36:32   4   A.   Yes, it does.

03:36:33   5   Q.   And how do you know?

03:36:34   6   A.   Well, for example, this equation, which is from the

03:36:41   7   second chapter in Brandstein, discloses the most robust,

03:36:44   8   most general way of representing -- or of calculating the

03:36:48   9   time delay -- excuse me, determining the time delay from

03:36:54 10   the information at hand.   And this is a discussion that

03:36:57 11   calculates delay in three dimensions.

03:37:01 12   Q.   And how does that compare with the formulas shown in

03:37:06 13   the '049 patent?

03:37:07 14   A.   Well, looking just a little bit ahead before the

03:37:10 15   highlighted text, if we were to go for the clause in -- in

03:37:15 16   which addresses two dimensions, if you reduce -- you can

03:37:19 17   get to two dimensions by setting the angle theta, which is

03:37:23 18   the third dimension in the elevation.   You set that to 90

03:37:26 19   degrees.   And that causes the third term to become 0, with

03:37:31 20   a linear array.   The second term becomes 0.   And in this

03:37:34 21   equation black reduces to the equation in red, which is the

03:37:39 22   two-dimensional linear array.

03:37:42 23   And that equation is identical to the equation

03:37:43 24   that's part of the specification of the '049 patent for

03:37:45 25   determining the delay when the target sound source that

03:37:49   1   emits the said target sound signal is in a two-dimensional

03:37:55   2   plane.

03:37:55   3   So the information of Brandstein could be reduced

03:37:57   4   by any person of ordinary skill in the art to the

03:38:00   5   two-dimensional equation that's specifically stated. The

03:38:04   6   equation is more general, but it's the same equation.

03:38:08   7   Q.   Would virtually anybody understand that who is of skill

03:38:13   8   in the art?

03:38:13   9   A.   A person of ordinary skill in the art would understand

03:38:14 10   that.

03:38:15 11   Q.   Now, if I understand, the red is not in Brandstein, but

03:38:27 12   that was done by you to explain?

03:38:29 13   A.   The red in -- is a simplification of the equation that

03:38:33 14   was done in Brandstein, simply by reducing from three

03:38:38 15   dimensions to two dimensions so that I could compare

03:38:42 16   directly the teachings of Brandstein to the specific

03:38:44 17   language in the claim in the specification of the patent.

03:38:47 18   Q.   And when you look at the patent, how do you know the

03:38:51 19   equation was already taught by Dr. Brandstein in his

03:38:55 20   textbook?

03:38:56 21   A.   Well, we can see the equation on the right side derived

03:38:59 22   from the equation of Brandstein is identical to the

03:39:02 23   equation in the patent. The only difference is that the

03:39:06 24   patent uses the variable d for distance instead of l for

03:39:13 25   length. That's like calling me Rich instead of Richard.

03:39:18   1   It doesn't change anything. It's just a different label.

03:39:22   2   Q.   Let's go to the next group of words, all in this

03:39:25   3   Limitation [C] where it explains: Wherein said delay is

03:39:30   4   represented in terms of number of samples.

03:39:33   5   Do you see that?

03:39:34   6   A.   Yes, I do.

03:39:35   7   Q.   And is that taught in Brandstein?

03:39:39   8   A.   Yes, it is. You can see that because the variable

03:39:44   9   highlighted on the right side, f, that stands for sampling

03:39:49 10   frequency. And that converts the time in seconds to the

03:39:54 11   time in number of samples.

03:39:55 12   So we can see that Brandstein discloses the text

03:39:58 13   in the patent, wherein said delay is represented in terms

03:40:02 14   of number of samples.

03:40:03 15   Q.   Thank you.

03:40:04 16   Now I want to keep going with this Limitation [C].

03:40:11 17   A.   Okay.

03:40:11 18   Q.   And the next group of words is -- concludes with: And

03:40:18 19   wherein said determination of said delay enables

03:40:22 20   beamforming for said array of sound sensors in a plurality

03:40:28 21   of configurations.

03:40:33 22   A.   Yes.

03:40:33 23   Q.   First thing I have to ask you is what -- what's with

03:40:37 24   all these saids? Why is there so many saids?

03:40:44 25   A.   That's one of my favorite legal words. Said means

03:40:47   1   "the" in legalese. So what that's telling me is

03:40:54   2   determination of the delay enables beamforming for the

03:41:00   3   array of sound sensors in a plurality of configurations.

03:41:02   4   And as we can see on the right-hand side, this is

03:41:03   5   really also disclosed by the teachings of the Brandstein

03:41:04   6   book: Delay-and-sum beamformers apply time shifts to

03:41:10   7   compensate for the propagation delays in the arrival of the

03:41:16   8   source signal at each microphone.

03:41:18   9   And what that means for this discussion is that

03:41:18   10 once you know what the delays are, then you can point the

03:41:21   11 beam in any direction you want. You need the delays to

03:41:25   12 point the beam. You don't need the delays to make the

03:41:29   13 beam, but you need the delays to point the beam in a

03:41:32   14 different direction.

03:41:33   15 Q. So are you confident that Dr. Brandstein's book renders

03:41:36   16 the entire delay step obvious to one of ordinary skill in

03:41:39   17 the art, well before the filing of the '049 patent?

03:41:43   18 A. That is correct. I do. And you can see the microphone

03:41:48   19 array below is a different configuration, sort of randomly

03:41:53   20 arranged on the wall. The equation is very general.

03:41:56   21 Q. So the same equation could be used no matter where you

03:41:59   22 put the arrays?

03:42:00   23 A. Or whatever configuration the microphones of the array

03:42:03   24 might be in.

03:42:04   25 Q. And when we say microphones and sound sensors, what's

03:42:08 1   the difference?

03:42:09 2   A.   In this context, none.

03:42:12 3   Q.   Let's move to the next step, Step [D].

03:42:30 4   Now, I want to ask you if Dr. Brandstein once

03:42:32 5   again discloses or teaches, quote, estimating a spatial

03:42:36 6   location of target sound signal from said received sound

03:42:41 7   signals by said sound source localization unit.

03:42:44 8   It's quite a mouthful?

03:42:46 9   A.   Yes.

03:42:47 10 Q.   Does Dr. Brandstein teach that?

03:42:50 11 A.   Yes.

03:42:50 12 Q.   And how do you know that?

03:42:54 13 A.   Well, we see the text here. The beamformer may be used

03:42:59 14 as a means for source localization by steering the array to

03:43:05 15 specific spatial points of interest in some fashion and

03:43:08 16 evaluating the output signal, typically its power.

03:43:11 17   This is part of the chapter that is entirely

03:43:15 18 devoted to sound source localization. And, from that, I

03:43:19 19 conclude that, yes, Brandstein does teach a spatial

03:43:21 20 location of said target sound signal from the received

03:43:26 21 sound signals.

03:43:27 22 Q.   Okay. Look let's look at the next group of words.

03:43:31 23 Limitation [E], and this has had quite a bit of discussion.

03:43:37 24   It's: Performing adaptive beamforming for

03:43:40 25 steering a directivity pattern of said array of said sound

03:43:45   1   sensors in a direction of said spatial location of said

03:43:52   2   target sound signal by said adaptive beamforming unit,

03:43:56   3   wherein said adaptive beamforming unit enhances said target

03:44:02   4   sound signal and partially suppresses said ambient noise

03:44:08   5   signals.

03:44:09   6   Did I read that correctly?

03:44:10   7   A.   Yes.

03:44:11   8   Q.   Does the Brandstein book explain and disclose or teach

03:44:18   9   all the words of Step [E] of Claim 1?

03:44:22   10   A.   Yes, it does, although the words are in different

03:44:25   11   order. Again, we're only concerned with things that

03:44:29   12   happened before 2010, so I'll not make comments about the

03:44:37   13   Echo.

03:44:39   14   But Brandstein discusses adaptive filters

03:44:43   15   extensively. One very clear spot where this happens is in

03:44:46   16   Section 5.2, Adaptive Beamformers. And you can see the

03:44:53   17   text includes a beamformer which adaptively forms its

03:44:56   18   directivity pattern is called an adaptive beamforming --

03:45:00   19   beamformer.

03:45:00   20   It simultaneously performs beam steering, which is

03:45:05   21   pointing the beam in the direction you want the beam to go.

03:45:07   22   And null steering, as I said before, pointing directions of

03:45:11   23   attenuated response in the direction that you don't want to

03:45:12   24   have a response from, presumably the interfering sources.

03:45:16   25   So, yes, Brandstein does teach the performance of

03:45:20   1   adaptive beamforming, fulfilling the specification in

03:45:25   2   Subparagraph [E] of Claim 1.

03:45:26   3   Q.   Now, I think I heard you say the word "Echo." Is

03:45:29   4   that -- you just misspoke?

03:45:31   5   A.   I -- I admittedly misspoke. I shouldn't have said

03:45:33   6   anything about it. I'm only talking about things before

03:45:34   7   2010.

03:45:34   8   Q.   Correct. And since Echo didn't exist before 2010, the

03:45:39   9   Echo is not part of this analysis at all, right?

03:45:41   10 A.   No, it was not.

03:45:41   11 Q.   Let's move to the last step of the method claim of

03:45:51   12 Claim 1. It's Limitation [F], or Step [F], where it

03:46:02   13 states: Suppressing said ambient noise signals by said

03:46:08   14 noise reduction unit for further enhancing said target

03:46:11   15 sound signal. Do you see that?

03:46:12   16 A.   Yes, I do.

03:46:12   17 Q.   Did I read it correctly?

03:46:14   18 A.   I believe you did.

03:46:15   19 Q.   Does the Brandstein book, which I have in my hand,

03:46:19   20 Exhibit 71P and your 49P, does that book expressly teach

03:46:23   21 that Step [F]?

03:46:32   22 A.   Yes, it does.

03:46:34   23 Q.   And how do you know that?

03:46:35   24 A.   Well, again, noise suppression is scattered throughout

03:46:38   25 the book, but Chapter 3 is devoted exclusively to

03:46:42 1 post-filtering techniques. And as you can see in the

03:46:43 2 context of microphone array, the term "post-filtering"

03:46:48 3 denotes the post-processing of the array output, in this

03:46:48 4 case, by a single channel noise suppression filter.

03:46:52 5   As you heard me say before, noise suppression

03:46:55 6 means getting rid of the noise. If you get rid of the

03:46:57 7 noise, you enhance the sound signal --

03:47:00 8 Q. So --

03:47:01 9 A. -- it teaches.

03:47:04 10 Q. Thank you.

03:47:04 11   So, in summary, is it your opinion that

03:47:11 12 Dr. Brandstein's book renders all of the limitations in

03:47:14 13 Claim 1 obvious.

03:47:15 14 A. Yes.

03:47:18 15 Q. And what's the impact of that conclusion?

03:47:21 16 A. The impact of the conclusion is, as I stated before, if

03:47:25 17 all of the subparts of Claim 1 are obvious by virtue of

03:47:36 18 prior -- prior art existing at the time of the invention.

03:47:39 19   And this book was published in 2001. The

03:47:41 20 invention was filed in 2010. Nine years prior. This is

03:47:47 21 old. If we have prior art that makes the claims obvious,

03:47:51 22 then the patent is invalid.

03:47:55 23 Q. Now, did the Patent Office -- patent examiner, when

03:48:03 24 examining the '049 application, at any time have this book

03:48:10 25 by Dr. Brandstein?

03:48:11   1   A.   No.

03:48:14   2   Q.   And how do you know that?

03:48:15   3   A.   Well, by law, the patent examiners are required to

03:48:20   4   disclose all of the sources that they used -- or he or she

03:48:29   5   used in making the judgment about whether patents should be

03:48:34   6   issued.   And that shows in the list of references cited.

03:48:37   7   And in the case of the '049 patent, all of the

03:48:40   8   references cited were prior patents.   This is a book, so

03:48:44   9   it's clear that Brandstein was not considered by the patent

03:48:47 10   examiner in making a decision about whether to issue the

03:48:50 11   patent, either the '049 or the previous patent.

03:48:55 12   Q.   So no books or articles cited?

03:49:04 13   A.   No books or articles cited.   Only other patents.

03:49:08 14   Q.   Foreign or domestic, it looks like, right?

03:49:11 15   A.   Yes.

03:49:11 16   Q.   But no literature of any kind?

03:49:14 17   A.   No literature.

03:49:15 18   Q.   Let's go back to Limitation [C].

03:49:22 19   Is Brandstein the only prior art reference that

03:49:27 20   discloses and teaches the determining a delay step of

03:49:33 21   Limitation [C]?

03:49:34 22   A.   No, it is not.

03:49:35 23   Q.   And which reference has already been discussed in this

03:49:39 24   trial showing all of the limitations of this claim -- of

03:49:43 25   Limitation [C]?

03:49:44   1   A.   Well, among others, we heard on Friday, I believe, from

03:49:50   2   Dr. Zhu -- quite possibly from Dr. Li -- that the paper

03:49:54   3   that Dr. Li presented in the ICASSP 2009 in Taiwan, which

03:50:00   4   is shown up here on the screen, disclosed the same method

03:50:03   5   of determining the delay that was cited in the '049 patent.

03:50:05   6   Q.   Now, can an inventor's own publication be used to

03:50:11   7   invalidate the same inventor's later-filed application?

03:50:16   8   A.   Absolutely.   It's totally legitimate prior art.

03:50:19   9   Q.   And why is it legitimate prior art?

03:50:21   10 A.   Because it was published more than a year before the

03:50:24   11 filing date of the patent.   In this case, the ICASSP

03:50:28   12 meeting is always in the spring.   I don't know the exact

03:50:31   13 month, but it would be April through June.   And the filing

03:50:34   14 date for the patent, that would have been 2009.   And the

03:50:37   15 filing date for patent was September 2010.

03:50:43   16 Q.   So since no patent was filed within a year of the

03:50:45   17 disclosure of the Li article, who owns the technology

03:50:49   18 discussed in the Li paper?

03:50:51   19 A.   We all own it.   The public owns it.   It's prior art.

03:50:56   20 Q.   Are there other articles or prior art that also

03:51:05   21 discloses all of the limitations set forth in Step [C] of

03:51:10   22 Claim 1?

03:51:11   23 A.   There are.   In fact, there are multiple other articles,

03:51:14   24 but time is short.   So I'd like to only cite one more.

03:51:19   25 Q.   And that is Defendants' Exhibit 51 on the screen?

03:51:23 1 A. Right. That's the paper by Dmochowski and co-authors

03:51:27 2 that I mentioned earlier. You can see the date of the

03:51:33 3 journal article was May 20 -- 2007.

03:51:39 4   And the title begins Direction of Arrival

03:51:42 5 Estimation. Direction of arrival estimation is another set

03:51:47 6 of words that indicates sound source localization.

03:51:49 7 Q. And what exactly is this article about, briefly?

03:51:52 8 A. It's about sound source localization, including how to

03:51:54 9 determine the delays used to perform sound source

03:52:02 10 localization in exactly the same way proposed by the '049

03:52:04 11 patent.

03:52:04 12 Q. And would someone know to use the information in this

03:52:09 13 Dmochowski article with the things taught in the Brandstein

03:52:13 14 book?

03:52:14 15 A. He certainly would. Among other things, the Brandstein

03:52:17 16 book is one of the citations in the Dmochowski article.

03:52:25 17 This Reference 10 here is, in fact, the same Chapter 8 that

03:52:29 18 I've been mentioning on sound source localization in the

03:52:31 19 Brandstein book.

03:52:31 20   And a person of ordinary skill in the art would

03:52:33 21 turn to the Brandstein book, which was by then well-known

03:52:37 22 as the primary reference in microphone array, for

03:52:42 23 information on all of the other technologies disclosed.

03:52:45 24 Q. And how do you know that the Dmochowski reference --

03:52:49 25 and I don't know if I'm pronouncing it right, but

03:52:52   1   Dmochowski is good as any, Exhibit 51, how do you know it

03:52:56   2   teaches all of the words set forth in Limitation or

03:53:01   3   Step [C] of Claim 1?

03:53:03   4   A.   Well, we can compare the text of Claim 1 to the

03:53:07   5   teachings of disclosures in Dmochowski. What we're looking

03:53:09   6   at is a figure from Dmochowski. The previous slide showed

03:53:12   7   the figure in its place in the reference. There it is in

03:53:15   8   the upper right-hand corner.

03:53:17   9   And now let's look at the text of the patent.

03:53:21   10   First, I call to your attention that the

03:53:24   11   microphones, as I mentioned before, are in a circular

03:53:26   12   array. Those are the yellow dots now.

03:53:30   13   So we talk -- shall I continue? Okay.

03:53:35   14   Determining a delay between each sound source --

03:53:40   15   I'm sorry, each of said sound sensors and an origin of said

03:53:43   16   array of said sound sensors. The -- the origin there is in

03:53:47   17   green in the diagram. Continuing.

03:53:49   18   Q.   Okay.

03:53:50   19   A.   As a function --

03:53:51   20   Q.   So let's -- so now let's get to as a function. So

03:53:56   21   you're confident that the determining a delay between each

03:54:01   22   of said sound sensors and an origin of said array of said

03:54:05   23   sound sensors, that's what we just discussed, right?

03:54:08   24   A.   Right.

03:54:09   25   Q.   And now I want to go to the next part, and we're

03:54:11   1   talking about this function, this as a function of.

03:54:13   2   A.   It's a function of distance.   So we have to look to see

03:54:17   3   that all of the parameters mentioned are included in the

03:54:20   4   teachings of the article.   The distance here is indicated

03:54:22   5   by the line that's highlighted in blue or turquoise.

03:54:27   6   Shall I continue?

03:54:27   7   Q.   No, wait for another question.

03:54:30   8   A.   Okay.

03:54:30   9   Q.   And do we know whether it has the next group of words,

03:54:39   10   a predefined angle --

03:54:40   11   A.   I -- I -- I'm sorry, I haven't finished the last group

03:54:44   12   of words.

03:54:44   13   Q.   Okay.

03:54:45   14   A.   I was waiting for the question.

03:54:47   15   Q.   Okay.

03:54:47   16   A.   As a function of distance between each of the said

03:54:51   17   sound source sens -- sensors and the origin, and that's the

03:54:53   18   part in the center.

03:54:54   19   Now, go ahead, please.

03:54:56   20   Q.   Okay.   Thank you.   I'm sorry.

03:54:57   21   Does the figure also show a predefined angle

03:55:02   22   between each of said sound sensors and a reference axis?

03:55:07   23   A.   Yes, it does.   We can see the reference axis is the

03:55:11   24   horizontal line that's highlighted in red.   The predefined

03:55:15   25   angle, the other side of the angle is the line that goes

03:55:19   1   from the center of the circle through the big black dot.

03:55:24   2   That angle is delineated by the Greek variable C, which

03:55:32   3   looks a little like a pitch fork, and it's the outer edge

03:55:37   4   of that wedge in yellow.

03:55:38   5   Q.   I see some more Greek letters.   I'm going to go to the

03:55:43   6   next group of words.   An azimuth angle, it's been discussed

03:55:47   7   a lot in this trial.   Does it also show an azimuth angle

03:55:50   8   between said reference axis and said target sound signal?

03:55:54   9   A.   Yes, it does show that.   In this case, the target sound

03:56:03   10   signal is shown as coming in from the upper right-hand

03:56:03   11   corner.   The path that the signal travels along is

03:56:09   12   indicated by the line in purple.   And the angle between the

03:56:12   13   reference axis, which is in red, and the direction of

03:56:13   14   arrival of the sound source, which is in purple, is

03:56:16   15   indicated by that variable theta, which looks like an oval

03:56:21   16   with a horizontal line through it.   And it is the outer

03:56:25   17   edge of the current wedge that's highlighted in yellow.

03:56:28   18   Q.   So theta is a larger angle than the pitch fork?   That's

03:56:33   19   what it looks like?

03:56:34   20   A.   Yes.   And -- and for this particular direction of

03:56:36   21   arrival.   It could be smaller in other cases.

03:56:38   22   Q.   Now, I notice there's an equation at the top of the

03:56:41   23   figure.   What is that equation?

03:56:43   24   A.   So that's the equation for determining the time delay.

03:56:48   25   Q.   And does it have all of the variables or letters that

03:56:52   1   we just discussed from Limitation [C]?

03:56:54   2   A.   It does.

03:56:59   3   Q.   The next group of words is: When said target sound

03:57:07   4   source that emits said target sound signal is in a

03:57:10   5   two-dimensional plane.

03:57:12   6   A.   Yes.

03:57:12   7   Q.   Is that clearly shown in the Dmochowski article?

03:57:18   8   A.   Yes, it is. A two-dimensional plane is just a surface

03:57:21   9   like this. There's nothing coming in and out of the plane,

03:57:24   10 either in the depiction or in -- or in the calculation, so

03:57:27   11 this is two dimensions.

03:57:28   12 Q.   And does the Dmochowski article explain or teach to

03:57:34   13 calculate the delay in a representation or number of

03:57:37   14 samples?

03:57:38   15 A.   As it happens, the equation in this figure is expressed

03:57:43   16 in the number -- in terms of the number of seconds. But to

03:57:46   17 convert from seconds to samples, is very easily done by

03:57:49   18 multiplying by the sampling frequency.

03:57:51   19   The system designer builds the sampling frequency

03:57:54   20 once into the design of the system, and we all use samples

03:57:58   21 and seconds interchangeably. Any -- we teach this to all

03:58:02   22 of our sophomores in electrical engineering program.

03:58:09   23 Q.   Okay. And so now we're going to go to the next group

03:58:11   24 of words again. And this is the final clause that says:

03:58:15   25 And wherein said determination of said delay enables

03:58:21   1   beamforming for said array of sound sensors in a plurality

03:58:25   2   of configurations.

03:58:28   3   A.   Yes.

03:58:28   4   Q.   Does the Dmochowski article teach or disclose that

03:58:33   5   group of words?

03:58:34   6   A.   Yes. Well, it says that the delays steer the

03:58:39   7   beamformer to the desired direction of arrival while the

03:58:42   8   beamformer weights -- those are the w's -- shape the beam

03:58:47   9   accordingly.

03:58:47   10   As far as the plurality of configurations is

03:58:49   11   concerned, as I've stated before, the equation does not

03:58:54   12   care where the sensors actually are. You just have to do

03:58:58   13   those measurements of the angles, and the proper delays

03:59:03   14   will come from the equation.

03:59:05   15   Q.   Now, would a person of ordinary skill in the art, prior

03:59:12   16   to the filing of the patent in 2010, would that person have

03:59:15   17   been motivated or know to combine the teachings of the

03:59:19   18   Dmochowski article with the adaptive beamformers discussed

03:59:22   19   in the book Microphone Arrays by Dr. Brandstein?

03:59:26   20   A.   Well, yes. Even if we just include the determination

03:59:30   21   of the delay portion of the paper itself, and there's a lot

03:59:33   22   more information in there, the reader -- a person of

03:59:36   23   ordinary skill in the art reading the paper would be

03:59:40   24   motivated to turn to Brandstein for additional information

03:59:44   25   about all of the other microphone arrays -- microphone

03:59:50 1 array technologies that are disclosed in Brandstein because

03:59:51 2 the paper itself points to Brandstein for further

03:59:55 3 information.

03:59:56 4 Q. So have you drawn any conclusions on whether or not it

03:59:59 5 would have been obvious to one of skill in the art to know

04:00:03 6 about or use the device or the method of Claim 1 in view of

04:00:08 7 Dmochowski and the Brandstein book?

04:00:10 8 A. Yes. A person of ordinary skill in the art would find

04:00:15 9 at least Paragraph [C] of Claim 1 obvious based on the

04:00:19 10 teachings of the patent. So I -- I would put a second

04:00:23 11 check next to that one. In fact, I'd put a third check,

04:00:27 12 given the material of Li.

04:00:29 13   So, collectively, I've -- my opinion is that the

04:00:32 14 patent is invalid, because as I indicated before, a person

04:00:35 15 of ordinary skill in the art would find in the paragraphs,

04:00:39 16 the teachings, the materials in the claims, obvious from

04:00:44 17 the material in the prior art that was issued at the time

04:00:49 18 of the filing date of the patent.

04:00:50 19 Q. And did I hear you say you could put a third check?

04:00:53 20 A. Yes, that would be the Li article.

04:00:55 21 Q. So are you suggesting that the Li article with

04:01:00 22 Brandstein, would also render the claimed invention

04:01:04 23 obvious?

04:01:04 24 A. That is correct.

04:01:05 25 Q. Now, I'm going to ask you, for the record, did the

04:01:08 1 patent examiner consider or have access to the Dmochowski

04:01:12 2 article when reviewing the '049 application at any time?

04:01:17 3 A. Very clearly, no.

04:01:18 4 Q. And how do you know that?

04:01:20 5 A. We know that, because, once again, the patent

04:01:25 6 examiner's required to disclose the references cited, taken

04:01:28 7 into consideration, and no journal article is in that list.

04:01:31 8 So clearly, the Dmochowski article being -- being a journal

04:01:36 9 article was not considered.

04:01:38 10 Q. Okay. You realize there's more than one claim asserted

04:01:41 11 in this case, right?

04:01:41 12 A. Yes.

04:01:42 13 Q. And do you know what claim that is?

04:01:43 14 A. Claim 8.

04:01:44 15 Q. Could you briefly tell us, first of all, that Claim 8

04:01:49 16 is shown on the screen, right?

04:01:51 17 A. Yes.

04:01:51 18 Q. And it begins with the words "the method of Claim 1,"

04:01:57 19 right?

04:01:57 20 A. Yes.

04:01:58 21 Q. Could you just kindly tell us the significance of those

04:02:03 22 introductory words of Claim 8?

04:02:04 23 A. You mean the method of Claim 1?

04:02:05 24 Q. Oh, sorry, method of Claim 1 in Claim 8.

04:02:08 25 A. Yes.

04:02:09   1   Q.   Right.   What does that mean?

04:02:11   2   A.   So that means that Claim 8 starts by assuming that we

04:02:14   3   use everything that was part of Claim 1.

04:02:17   4   Q.   And did you review the validity of Claim 8 when

04:02:24   5   combined with Claim 1?

04:02:25   6   A.   Yes, I did.

04:02:26   7   Q.   And what did you conclude with respect to the validity

04:02:30   8   of Claim 8?

04:02:31   9   A.   Well, again, I concluded that Claim 8 is invalid

04:02:36   10   because it is -- it would be obvious to a person of

04:02:40   11   ordinary skill in the art to implement Claim 8, given the

04:02:45   12   teachings of Brandstein combined with Dmochowski combined

04:02:48   13   with a third reference, which I identify as Abutalebi.

04:02:53   14   Q.   Could you just briefly explain, briefly, what is

04:02:56   15   Claim 8 about?   What is it attempting to cover?

04:03:00   16   A.   Sure.   What Claim 8 is all about is the idea that you

04:03:03   17   can improve the performance of your system by taking the

04:03:06   18   signal coming in, breaking it up into multiple subbands --

04:03:11   19   that means dividing the signal according to frequency

04:03:11   20   components, lower frequencies in one channel, high

04:03:17   21   frequencies in another channel, and so forth, medium

04:03:18   22   frequencies in the third, multiple subbands, processing

04:03:21   23   each of the subbands independently, separately, in

04:03:25   24   parallel, and then putting the whole thing back together

04:03:27   25   when you're all done.

04:03:28   1   Q.   And is that an obvious step?

04:03:32   2   A.   Well, it's -- it's obvious given Abutalebi on top of

04:03:36   3   Dmochowski and -- and Brandstein.

04:03:38   4   Q.   Okay.   What is Abutalebi?

04:03:40   5   A.   So Abutalebi is a patent application.   I understand the

04:03:45   6   patent eventually issued from that, but I did not study

04:03:49   7   anything more than the application.

04:03:50   8   The publication date was April 15th, 2004, well

04:03:56   9   before -- much older than the file date of the '049 patent.

04:03:59   10   And it describes a method and system for processing subband

04:04:05   11   signals using adaptive filtering.

04:04:07   12   Q.   Now, because of the publication date, it's undisputed

04:04:11   13   that this is also prior art, right?

04:04:12   14   A.   Yes.   Yes.   And, in fact, the filing date is going to

04:04:16   15   be even before the publication date.

04:04:18   16   Q.   But it's the publication date that makes it prior art,

04:04:21   17   right?

04:04:21   18   A.   Yes.

04:04:22   19   Q.   Okay.   Let's go to that Claim 8.

04:04:26   20   And I'd like to ask you, with respect to the green

04:04:30   21   language that I've highlighted on the screen, does

04:04:33   22   Abutalebi disclose a noise reduction unit that performs

04:04:38   23   noise reduction in a plurality of frequency subbands?

04:04:43   24   A.   Yes.   This system depicts -- shows what I just

04:04:48   25   described.   You can see the signal coming in, which is x of

04:04:55   1   n on the left-hand side. It's separated into parallel

04:05:00   2   channels that are indicated by the red lines. The red

04:05:03   3   lines undergo the APB, adaptive processing block, that's

04:05:03   4   followed by the NAPB, which is non-adaptive processing

04:05:09   5   block.

04:05:09   6   And if we look at the text in green above that,

04:05:11   7   that further elaborates on what the non-adaptive processing

04:05:15   8   block is, and it states: It's a single-microphone Wiener

04:05:20   9   filter used to eliminate the residual uncorrelated noise.

04:05:25 10   Now, Wiener filter is exactly the kind of noise

04:05:29 11   reduction unit that is specified in the specification of

04:05:31 12   the '049 patent. So this indicates that the figure

04:05:35 13   indicates that wherein said noise reduction unit performs

04:05:40 14   noise reduction, and that's the green box, in a plurality

04:05:43 15   of frequency subbands, and those are the parallel red

04:05:45 16   lines.

04:05:45 17   Q. I mean, this -- this sounds like pretty complicated

04:05:48 18   stuff to me. But who's this stuff written for?

04:05:52 19   A. It's written just for a person of ordinary skill in the

04:05:55 20   art, as we mutually defined it earlier.

04:05:58 21   Q. Okay. There's additional language in Claim 8, and I'd

04:06:03 22   like to read into the record, and can you explain how the

04:06:06 23   Abutalebi reference discloses and teaches: Wherein said

04:06:12 24   frequency subbands are employed by an analysis filterbank

04:06:16 25   of said adaptive beamforming unit for subband adaptive

04:06:22 1 beamforming?

04:06:22 2 A. Okay. So that part of the text is actually very

04:06:25 3 simple. That's just the part of the text that says you

04:06:27 4 take the signal coming in, you break it up into different

04:06:31 5 frequency components. And you can see in the chart those

04:06:36 6 blocks in yellow. Those are the filters that separate the

04:06:39 7 high frequencies from the low frequencies. And you can see

04:06:42 8 on top it's even labeled analysis filterbank, which is the

04:06:46 9 exact same text that we see: Are employed by an analysis

04:06:50 10 filterbank of said adaptive beamforming unit for subband

04:06:54 11 adaptive beamforming.

04:06:55 12   The correspondence is very exact, very literal.

04:06:58 13 There's no doubt. Beyond obvious for me.

04:07:01 14 Q. And have you drawn a conclusion with respect to the

04:07:05 15 validity or invalidity of Claim 8?

04:07:07 16 A. Yes. For the reasons that I've described, that Claim 8

04:07:10 17 is obvious based on the teachings of Abutalebi and in

04:07:14 18 conjunction with Brandstein and Ward. Actually, Claim 8 is

04:07:18 19 just Abutalebi by itself, I believe.

04:07:21 20 Q. But since it's a dependent claim on Claim 1?

04:07:24 21 A. Yes, thank you, counselor, for clarifying that. Since

04:07:28 22 it's a dependent claim on Claim 1, we need to also include

04:07:32 23 at least Brandstein or, alternatively, Brandstein and Ward

04:07:36 24 or Brandstein and Li.

04:07:38 25 Q. And would someone of ordinary skill in the art have

04:07:41	1	been motivated to combine these references like you did,
04:07:44	2	the Abutalebi with Brandstein and Dmochowski?
04:07:49	3	A. Well, of course, Abutalebi only talks about the subband
04:07:53	4	processing. You need the rest of the references to --
04:07:55	5	to -- to teach how to perform the rest of the adaptive
04:08:00	6	filtering and the other technologies described.
04:08:03	7	Q. Now, you said earlier that the Patent Office didn't
04:08:05	8	have any literature, remember?
04:08:06	9	A. That's correct.
04:08:07	10	Q. And the Patent Office didn't have Brandstein or
04:08:10	11	Dmochowski because that's literature, right?
04:08:13	12	A. That's also correct.
04:08:15	13	Q. But this time we're talking about a patent publication
04:08:19	14	with Abutalebi, right?
04:08:21	15	A. That's right.
04:08:21	16	Q. And did the Patent Office have the Abutalebi patent or
04:08:26	17	publication when it allowed the '049 patent or at any time
04:08:29	18	before that time?
04:08:29	19	A. No, it did not.
04:08:30	20	Q. And how do you know that?
04:08:32	21	A. Well, it's the same test. You look at the list of
04:08:35	22	references cited. This time we have to look a tiny bit
04:08:39	23	more -- more closely. But when we look at the list of
04:08:43	24	references cited, none of those items on the list are the
04:08:47	25	Abutalebi reference.

04:08:48   1   Q.   So none of the -- none of the prior art we discussed

04:08:56   2   today was before the Patent Office?

04:08:57   3   A.   That's correct.

04:08:58   4   Q.   And did you review the prior art that the Patent Office

04:09:02   5   did have?

04:09:02   6   A.   Yes, I did.

04:09:06   7   MR. RE: And, for the record, the Abutalebi

04:09:07   8   publication is Defendants' Exhibit 46.

04:09:13   9   A.   Oh, thank you.

04:09:15   10   Q.   (By Mr. Re)   And how does the prior art that we've been

04:09:17   11   discussing today compare, relative to the prior art that

04:09:21   12   the Patent Office did have?

04:09:22   13   A.   Well, the prior art that we're discussing today is very

04:09:29   14   important, because my reading of the file history tells me

04:09:32   15   that the '049 patent, or actually more exactly the patent

04:09:36   16   that preceded it, was issued specifically because it taught

04:09:42   17   the determination of the delay step, the implication being

04:09:45   18   that without the determination of the delay step, the

04:09:49   19   patent would not have issued in the first place.

04:09:51   20   So I conclude from that that the material in

04:09:56   21   Brandstein is very important, the material in Dmochowski is

04:10:01   22   very important, and without that, the patent would not have

04:10:04   23   been issued.

04:10:04   24   Q.   So let me get this straight, you don't really think the

04:10:07   25   Patent Office just simply made a mistake, do you?

04:10:10   1   A.   No, no.   They're -- nobody's perfect.   The presumption

04:10:13   2   is that the patent is correct.   They work from the

04:10:17   3   available information that they look at, and it's simply --

04:10:21   4   I think they simply didn't search widely enough.

04:10:25   5   Q.   And so they just didn't have the information whenever

04:10:27   6   they examined either the '049 or its predecessor

04:10:33   7   surrendered '756 patent?

04:10:35   8   A.   Right.   My guess is the normal thing to do is just to

04:10:39   9   look at other patents.

04:10:40   10   MR. RE: I'll pass the witness.

04:10:42   11   Thank you very much, Dr. Stern.

04:10:44   12   THE WITNESS: You're welcome.

04:10:45   13   THE COURT: All right.   Before we proceed with

04:10:47   14   Plaintiff's cross-examination of this witness, we're going

04:10:49   15   to take a brief recess, ladies and gentlemen.

04:10:51   16   If you'll simply close your notebooks, leave them

04:10:55   17   in your chairs, follow all the instructions I've given you,

04:10:58   18   including not to discuss the case among yourselves.   We'll

04:11:01   19   be back here -- I'm going to try to keep this as a short

04:11:06   20   recess -- we'll be back here shortly to continue.

04:11:12   21   The jury is excused for recess.

04:11:15   22   COURT SECURITY OFFICER: All rise.

04:11:17   23   THE WITNESS: Your Honor, may I step down, as

04:11:19   24   well?

04:11:20   25   THE COURT: When the jury leaves.   Just stay where

04:11:25	1	you are.
04:11:25	2	(Jury out.)
04:11:25	3	THE COURT: Mr. Rubino, are you going to use this
04:11:32	4	demonstrative during your cross-examination?
04:11:35	5	MR. RUBINO: No, I'm not going to, Your Honor.
04:11:36	6	THE COURT: All right. During a recess, let's
04:11:38	7	take it down and put it back.
04:11:40	8	The Court stands in recess.
04:11:41	9	COURT SECURITY OFFICER: All rise.
04:23:05	10	(Recess.)
04:23:06	11	(Jury out.)
04:23:06	12	COURT SECURITY OFFICER: All rise.
04:23:10	13	THE COURT: Be seated, please.
04:24:44	14	Mr. Rubino, if you'd like to go to the podium and
04:24:49	15	prepare for cross-examination.
04:24:50	16	Are there binders that the Plaintiff has to
04:24:52	17	distribute? Let's do that now, please.
04:25:22	18	Mr. Mixon, if you'd bring in the jury, please.
04:25:26	19	COURT SECURITY OFFICER: All rise.
04:25:29	20	THE WITNESS: Thank you.
04:25:32	21	(Jury in.)
04:25:36	22	THE COURT: Please be seated.
04:26:03	23	All right. Ladies and gentlemen, we'll now
04:26:05	24	proceed with cross-examination of the witness by
04:26:09	25	the Plaintiff.

04:26:09   1   Mr. Rubino, you may proceed.

04:26:09   2   MR. RUBINO: Thank you.

04:26:09   3   CROSS-EXAMINATION

04:26:14   4   BY MR. RUBINO:

04:26:14   5   Q.   Good afternoon, Dr. Stern.

04:26:15   6   A.   Good afternoon.

04:26:16   7   Q.   Dr. Stern, have you ever heard of something called a

04:26:19   8   super directive beamformer?

04:26:21   9   A.   Yes.

04:26:21 10   Q.   And you've also seen that referred to as SD-BF, right?

04:26:27 11   A.   Yes.

04:26:27 12   Q.   And did you hear Dr. Kiaei -- Kiaei --

04:26:30 13   A.   Kiaei.

04:26:30 14   Q.   Kiaei, thank you -- present earlier about how Amazon

04:26:35 15   uses a super directive beamformer?   You heard that, right?

04:26:37 16   A.   Yes.

04:26:38 17   Q.   And you entered an expert report in this case, right?

04:26:43 18   A.   Yes.

04:26:43 19   Q.   And in your expert report, you said that a super

04:26:49 20   directive beamformer is an adaptive beamformer, right?

04:26:51 21   A.   I'd have to check.

04:26:57 22   Q.   Would you be surprised if you said those words, sir?

04:27:01 23   A.   Probably not.

04:27:02 24   Q.   So you think you said that a super directive beamformer

04:27:04 25   is an adaptive beamformer, right?

04:27:06 1 A.   I might have said that, but it would have been wrong.

04:27:09 2 So...

04:27:10 3 Q.   So you think you may have said it, but now you're

04:27:17 4 saying you were wrong in your expert report; is that your

04:27:19 5 testimony?

04:27:19 6 A.   It's possible. I'd have to check to see if I said it.

04:27:25 7   MR. RUBINO: Could we please put up Dr. Stern's

04:27:28 8 expert report at Paragraph 89, please, Page 49?

04:27:41 9 Q.   (By Mr. Rubino) Dr. Stern, do you see --

04:27:43 10   MR. RUBINO: And can we enlarge Paragraph 89,

04:27:45 11 please? Thank you, Mr. Thompson.

04:27:48 12 Q.   (By Mr. Rubino) Do you see where you say: The SD-BF

04:27:51 13 is an adaptive beamforming unit?

04:27:55 14   Do you see that, sir?

04:27:56 15 A.   I see that, but -- okay. Now I understand. The Court

04:28:01 16 construed a particular definition of adaptive beamforming

04:28:04 17 unit, which I had forgotten, in answering the previous

04:28:08 18 questions.

04:28:09 19   What the super directive beamformer -- well, let's

04:28:11 20 leave it at that. You can ask further if you wish.

04:28:15 21 Q.   So you made this statement, right, sir, that the super

04:28:19 22 directive beamformer is an adaptive beamforming unit,

04:28:21 23 right, sir?

04:28:22 24 A.   Yes.

04:28:22 25 Q.   And you applied the Court's construction both in your

04:28:25   1   infringement -- in your invalidity analysis, right?

04:28:25   2   A.   Yes.

04:28:29   3   Q.   You applied the Court's construction?

04:28:29   4   A.   Yes.

04:28:30   5   Q.   And so, in your opinion, applying the Court's

04:28:32   6   construction, a super directive beamformer is an adaptive

04:28:35   7   beamformer, right, sir?

04:28:36   8   A.   Yes.

04:28:36   9   Q.   And you heard Dr. Kiaei say Amazon uses a super

04:28:40   10   directive beamformer, right, sir?

04:28:41   11   A.   Yes.

04:28:44   12   Q.   In the opinions you just spoke about a few minutes

04:28:56   13   earlier, you spoke of something called obviousness, right,

04:28:59   14   sir?

04:28:59   15   A.   Yes.

04:28:59   16   Q.   Have you ever heard of a concept called anticipation?

04:29:01   17   A.   Yes.

04:29:03   18   Q.   And you know that anticipation in patent law is

04:29:06   19   different from obviousness, right, sir?

04:29:08   20   A.   Yes.

04:29:09   21   Q.   And anticipation is where you find all of the

04:29:12   22   limitations of a particular claim in one reference, right,

04:29:15   23   sir?

04:29:15   24   A.   Yes.

04:29:15   25   Q.   And you don't render any opinions today -- you have not

04:29:19   1   rendered any opinions about anticipation, right, sir?

04:29:22   2   A.   That is correct.

04:29:24   3   Q.   So it is not your opinion that any reference that

04:29:28   4   you've discussed today teaches every single element of the

04:29:33   5   claims asserted here, right, sir?

04:29:35   6   A.   That is correct.

04:29:36   7   Q.   And regarding the Brandstein reference, you still have

04:29:50   8   that on your desk -- on the podium with you, right, sir?

04:29:54   9   A.   I do.

04:29:54 10   Q.   And you know that, in order to meet the limitations of

04:29:57 11   Claim 1, you would have to have a sound source localization

04:30:01 12   unit, an adaptive beamforming unit, a noise reduction unit,

04:30:07 13   all in a single digital signal processor, correct?

04:30:10 14   A.   Yes.

04:30:11 15   Q.   And you didn't find anywhere in that book where all

04:30:19 16   three of those units were integrated into a single digital

04:30:28 17   signal processor, right, sir?

04:30:28 18   A.   That's correct.

04:30:30 19   Q.   In fact, you didn't find that in any of the references

04:30:30 20   that you looked and that you presented on today, correct,

04:30:33 21   sir?

04:30:33 22   A.   That's correct, yes.

04:30:33 23   Q.   So it wasn't in Li -- the Li article that you looked

04:30:37 24   at, right?

04:30:37 25   A.   Correct.

04:30:38	1	Q. Wasn't in Abutalebi, right?
04:30:40	2	A. Correct.
04:30:41	3	Q. Wasn't in Dmochowski?
04:30:42	4	A. Neither there.
04:30:42	5	Q. And it wasn't in Brandstein?
04:30:45	6	A. Correct.
04:30:45	7	Q. So anything you have to provide on that is based on
04:30:49	8	just your opinions looking at the references today, right?
04:30:54	9	A. That's correct.
04:30:58	10	Q. And that was the digital signal processor limitation,
04:31:03	11	right, sir?
04:31:04	12	A. That is correct.
04:31:05	13	Q. And you heard -- you heard all the testimony in this
04:31:09	14	case, right?
04:31:10	15	A. I did.
04:31:11	16	Q. And you heard Dr. Zhu talk about how it took her two
04:31:15	17	years to develop this technology and get it all into a
04:31:18	18	digital signal processor, right?
04:31:19	19	A. I did.
04:31:19	20	Q. And you heard how it took Amazon four years to get
04:31:23	21	everything to work, right?
04:31:25	22	A. Yes.
04:31:25	23	Q. And now it's your testimony that it would have been so
04:31:30	24	simple to put all this stuff together into a digital signal
04:31:33	25	processor; is that what you're saying today?

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04:31:35   1   A.   Absolutely.

04:31:35   2   Q.   So it's all based on what you think about a digital

04:31:40   3   signal processor, right?

04:31:41   4   A.   Yes.

04:31:41   5   Q.   But you yourself, sir, you're not a hardware expert,

04:31:46   6   are you?

04:31:46   7   A.   That's correct.

04:31:49   8   Q.   You don't have any direct experience in computer

04:31:52   9   hardware, right?

04:31:53  10   A.   Yes -- I mean, yes, that's correct.

04:31:57  11   Q.   You're not familiar with the concept of a

04:32:00  12   microprocessor data sheet, right?

04:32:01  13   A.   That's not true.

04:32:03  14   Q.   Did you learn about it at your deposition, sir?

04:32:07  15   A.   I've seen that before.

04:32:09  16   Q.   So is it your testimony that you didn't say at your

04:32:13  17   deposition in this case that you were not familiar with the

04:32:16  18   concept of a microprocessor data sheet; is that what you're

04:32:20  19   saying?

04:32:20  20   A.   In the context of the question that was framed at the

04:32:23  21   deposition, yes.

04:32:23  22   Q.   So, at your deposition, you did say that you're not

04:32:28  23   familiar with the concept of a microprocessor data sheet,

04:32:32  24   right?

04:32:32  25   A.   That is correct.
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04:32:34   1   Q.   And also it's not within your purview to look at

04:32:38   2   architecture of processors, right?

04:32:41   3   A.   Also correct.

04:32:42   4   Q.   You never designed an instruction set?

04:32:47   5   A.   Correct.

04:32:47   6   Q.   You don't normally come across processor instruction

04:32:50   7   sets for digital signal processors in your research, right?

04:32:55   8   A.   That's correct.

04:32:55   9   Q.   And, in fact, you said at your deposition that you try

04:32:57 10   to avoid it, right?

04:32:59 11   A.   Also true.

04:32:59 12   Q.   So you're not really a processor expert, are you?

04:33:03 13   A.   Absolutely correct.

04:33:04 14   Q.   With regard to the Brandstein reference, again, the

04:33:18 15   book you still have in front of you, you've referred to

04:33:20 16   that whole thing as Brandstein, right?

04:33:24 17   A.   That's right.

04:33:24 18   Q.   But you know that you've relied on multiple chapters of

04:33:28 19   that book in your analysis, right?

04:33:30 20   A.   I've made that clear, yes.

04:33:31 21   Q.   And you've relied on Chapter 3, right?

04:33:35 22   A.   Yes.

04:33:35 23   Q.   Chapter 5?

04:33:37 24   A.   Yes.

04:33:37 25   Q.   Chapter 8?

04:33:39	1	A. Yes.
04:33:40	2	Q. Spanning hundreds of pages of that book, right?
04:33:42	3	A. It's a small book, but, yes.
04:33:45	4	Q. It's 400 pages, right, sir?
04:33:46	5	A. Close to 400.
04:33:52	6	Q. And you also know that those chapters aren't written by
04:34:04	7	Dr. Brandstein, right?
04:34:04	8	A. I had already pointed that out.
04:34:06	9	Q. So Chapter 3 wasn't authored by Dr. Brandstein; it was
04:34:09	10	authored by somebody else, right?
04:34:11	11	A. Correct, they were all authored by specialists chosen
04:34:15	12	and selected for their speciality.
04:34:15	13	Q. But not Dr. Brandstein?
04:34:16	14	A. Correct.
04:34:17	15	Q. Neither was Chapter 8 that was written by a different
04:34:20	16	set of people -- different from Chapter 3, right?
04:34:20	17	A. Correct, from Brandstein's group.
04:34:23	18	Q. But not Dr. Brandstein?
04:34:25	19	A. Correct.
04:34:28	20	Q. You said from Brandstein's group?
04:34:34	21	A. Yes.
04:34:37	22	MR. RUBINO: Can we put up DTX-49 at 102, please?
04:34:48	23	Q. (By Mr. Rubino) Chapter 5 was written by -- looks like
04:34:53	24	two Japanese people out of NEC; isn't that right?
04:34:58	25	A. That's true. I was referring to Chapter 8, which is

04:35:00   1   what the question was about.

04:35:01   2   Q.   Chapter 5 doesn't come from Brandstein's group, does

04:35:04   3   it?

04:35:05   4   A.   Correct.

04:35:05   5   Q.   Chapter 3 doesn't come from Brandstein's group, does

04:35:08   6   it?

04:35:08   7   A.   Correct.

04:35:15   8   MR. RUBINO: If we could please have that same

04:35:22   9   exhibit at Page -- Chapter 12 -- or 18 -- Chapter 18, Page

04:35:36   10   386.   Forward two pages, please.   There we go.   Thank you.

04:35:52   11   Q.   (By Mr. Rubino)   Now, Dr. Stern, you referenced this

04:35:55   12   page earlier, right?

04:35:56   13   A.   Yes, I did.

04:35:56   14   Q.   And you said you wanted to look at the fine print,

04:35:59   15   right?

04:35:59   16   A.   The fine print was Section 8.1, yes -- 18.1.

04:36:05   17   MR. RUBINO: Can we move up a little bit, please,

04:36:07   18   Mr. Thompson?   Thank you.   Can you please highlight the

04:36:12   19   first four lines of that passage?

04:36:15   20   Q.   (By Mr. Rubino)   Dr. Stern, now, this says the

04:36:22   21   culmination of the Brandstein book, that: After 20 years

04:36:25   22   of active research, however, we cannot claim that

04:36:28   23   microphone array processing has had the success that many

04:36:31   24   of us hoped for.   And many will wonder when the great

04:36:36   25   breakthrough in microphone array processing will finally

04:36:39   1   come, if ever.

04:36:41   2   You see that, right?

04:36:41   3   A.   I do.

04:36:42   4   Q.   And so you know that at the time of this book, no one

04:36:45   5   had put all these elements together, right?

04:36:48   6   A.   That's correct.

04:36:48   7   Q.   And that you can't point to anyone prior to 2010 who,

04:36:54   8   if ever, put any of these elements all together into the

04:36:57   9   claim of the patent, right, sir?

04:36:59 10   A.   That's not correct.

04:37:00 11   Q.   You can't point to any single reference that you've

04:37:04 12   identified today where someone has put together all the

04:37:08 13   elements into Claim 1 of the patent, right, sir?

04:37:11 14   A.   That's correct. But outside of the context of the

04:37:17 15   report --

04:37:18 16   MR. RUBINO: Move to strike the remainder,

04:37:20 17   Your Honor.

04:37:20 18   THE COURT: I'll sustain the objection that the

04:37:23 19   answer is non-responsive after "that's correct." And I'll

04:37:26 20   strike that portion of the answer after "that's correct."

04:37:29 21   MR. RUBINO: Pass the witness.

04:37:30 22   THE COURT: All right. Redirect, Mr. Re?

04:37:39 23   I'll take it as a yes since you've gone back to

04:37:42 24   the podium.

04:37:43 25   MR. RE: Yes, Your Honor, I'm sorry.

04:37:44   1   THE COURT: That's all right.

04:37:44   2   MR. RE: I'm still concentrating.

04:37:46   3   THE COURT: Please continue. Don't quit

04:37:49   4   concentrating.

04:37:51   5   MR. RE: Okay. If I may use the ELMO.

04:37:51   6   REDIRECT EXAMINATION

04:37:54   7   BY MR. RE:

04:37:54   8   Q.   You were -- your cross-examination began with this

04:38:10   9   discussion, and counsel showed you only the words at the

04:38:13   10   top of Paragraph 89. Do you remember that?

04:38:15   11   A.   Yes.

04:38:15   12   Q.   And what were you discussing in Paragraph 89 where

04:38:19   13   counsel didn't show you what's below it?

04:38:22   14   A.   Well, counsel was asking about super directive

04:38:30   15   beamforming, and I had stated -- may I go on?

04:38:33   16   Q.   Yes, if you're going to explain.

04:38:35   17   A.   Yes. The question was, is the super directive

04:38:38   18   beamformer adaptive? And I had said, no. A super

04:38:41   19   directive beamformer is a type of fixed beamformer.

04:38:44   20   However, in this particular application, it was

04:38:46   21   made adaptive within the context of a definition by the

04:38:50   22   Court by the inclusion of steering delays at the inputs to

04:38:55   23   the elements of the super directive beamformer.

04:38:56   24   So the construction was adaptive, but the super

04:39:00   25   directive beamformer in and of itself is fixed.

04:39:02   1   Q.   And how do you know that from looking at the figure

04:39:05   2   that you're showing on the ELMO?   It's Figure 3 in

04:39:09   3   Paragraph 89 of your report.

04:39:10   4   A.   You can see -- let me find them.

04:39:15   5   Q.   Go to the microphone if you can.

04:39:18   6   A.   I need to review this because this -- give me a second.

04:39:22   7   Q.   First of all, what reference are you discussing in the

04:39:25   8   expert report?

04:39:26   9   A.   So -- so I'm discussing a reference called Saric.

04:39:28   10   Q.   And your opinion today did not in any way -- in any way

04:39:33   11   rely on Saric; isn't that right?

04:39:35   12   A.   That is correct.

04:39:35   13   Q.   And, in fact, your -- your conclusions were about

04:39:44   14   Dmochowski showing Limitation [C], right?

04:39:47   15   A.   That is correct.

04:39:48   16   Q.   The Li paper --

04:39:49   17   THE COURT: Just a minute, counsel.

04:39:51   18   Do you have an objection?

04:39:52   19   MR. RUBINO: Objection, leading, Your Honor.

04:39:54   20   THE COURT: Sustained as to leading.

04:39:57   21   Restate your question in a non-leading form.

04:40:01   22   Q.   (By Mr. Re)   Can you just give me your conclusions and

04:40:04   23   explain whether any of your conclusions rely in any way on

04:40:07   24   the Saric reference?

04:40:08   25   A.   My conclusion was that Claims 1 -- Claims 1 and 8 of

04:40:13   1   the '049 patent were invalid based on the prior art. Those

04:40:15   2   conclusions were rendered independently of the Saric

04:40:18   3   reference, although the Saric reference was a number -- a

04:40:24   4   larger number of references that were in the report.

04:40:26   5   Q.   But we elected not to present that in this case, right?

04:40:29   6   A.   That is correct.

04:40:29   7   Q.   And so the elected references for trial were

04:40:34   8   Brandstein, right?

04:40:34   9   A.   Yes.

04:40:34   10   Q.   Dmochowski?

04:40:36   11   A.   Yes.

04:40:37   12   Q.   Li, as well, right?

04:40:39   13   A.   Yes.

04:40:39   14   Q.   And did you have an opinion about Li and whether the

04:40:43   15   patent would have issued had the examiner had Li?

04:40:46   16   A.   If the examiner had Li, the patent would not have

04:40:49   17   issued.

04:40:50   18   Q.   And if the examiner had Brandstein or Dmochowski or

04:40:54   19   even Abutalebi in combination, would the examiner have

04:41:00   20   allowed the claims?

04:41:01   21   A.   If the examiner had any of those prior art, the patent

04:41:03   22   would not have issued.

04:41:04   23   Q.   And that opinion in no way relied upon the Saric

04:41:08   24   reference which counsel was asking you in

04:41:11   25   cross-examination, right?

04:41:12   1   A.   That is correct.

04:41:13   2   Q.   Now, counsel also gave the impression, I thought, that

04:41:18   3   someone put it together.   Did you hear that?

04:41:20   4   A.   I sure did.

04:41:22   5   Q.   What -- what did you interpret counsel was thinking or

04:41:25   6   conveying about someone finally putting it together in

04:41:29   7   2010?

04:41:29   8   A.   Well, keep in mind the Brandstein book was written in

04:41:33   9   2001, between 2001 and 2010, there was a great deal of

04:41:40   10   continued activity in microphone arrays.   And the

04:41:44   11   technology became much more viable and successful.   The

04:41:49   12   Microsoft Xbox is an example.

04:41:52   13   Q.   Now, did Dr. Li and his group in any way have any

04:42:00   14   success that you know of pertaining to the claimed

04:42:02   15   inventions?

04:42:03   16   A.   To be honest, I don't know.   I -- I can't make a

04:42:06   17   statement about that.   I just don't know.

04:42:07   18   Q.   Right.   And, in fact, you considered what we call

04:42:09   19   secondary considerations; do you remember that?

04:42:12   20   A.   I did.

04:42:12   21   Q.   And you considered what we call nexus; do you remember

04:42:15   22   that?

04:42:15   23   A.   Yes.

04:42:16   24   Q.   And did you find any -- any real-world facts that have

04:42:22   25   any connection with respect to the invention that could in

04:42:26   1   any way be termed success?

04:42:29   2   MR. RUBINO: Objection, Your Honor.

04:42:30   3   THE COURT: State your objection.

04:42:31   4   MR. RUBINO: Both leading and beyond the scope of

04:42:33   5   cross.

04:42:33   6   THE COURT: I'll sustain as to leading.

04:42:37   7   Q. (By Mr. Re) Did you understand at all what counsel was

04:42:39   8   referring to by there was no success yet?

04:42:44   9   A. I think that I should take counsel literally as stated

04:42:49 10   in early 2001, the -- what matters is whether the

04:42:53 11   technologies were known. Whether they were successful or

04:42:56 12   not, is immaterial to the consideration of whether the

04:42:58 13   patent is valid.

04:43:01 14   Q. Do you know of anyone who was successful with the Li

04:43:07 15   invention?

04:43:08 16   A. I don't know.

04:43:09 17   Q. Counsel also asked you about we had no teaching about

04:43:18 18   putting the units in the DSP. Do you remember that?

04:43:21 19   A. I do.

04:43:24 20   MR. RE: And let's call up what I put up DDX-14

04:43:40 21   from the presentation. I believe it was the Brandstein

04:43:42 22   book.

04:43:42 23   Q. (By Mr. Re) And do you see where I read into the

04:43:46 24   record: The language wherein the three units are in the

04:43:50 25   digital signal processor?

04:43:50   1   A.   Yes.

04:43:50   2   Q.   And you highlighted a portion from the Brandstein book,

04:43:53   3   right?

04:43:53   4   A.   I did.

04:43:54   5   Q.   Please explain to the ladies and gentlemen of the jury

04:43:57   6   why this is an express teaching with regard to the

04:44:00   7   highlighted language?

04:44:01   8   A.   Well, the Brandstein book tells us that we have the

04:44:04   9   DSPs that allow us to implement everything in the DSP

04:44:09 10   technology in real-time.   That's -- that's what the text

04:44:12 11   states.

04:44:12 12   Q.   In fact, it says: We have affordable DSPs that allow

04:44:18 13   us to implement all but --

04:44:20 14   A.   The most complex schemes.

04:44:22 15   THE COURT: Gentlemen, you're going to talk one at

04:44:24 16   a time in this courtroom.   I've made that clear.   There's

04:44:26 17   no reason you can't do that.

04:44:28 18   THE WITNESS: I apologize, Your Honor.

04:44:29 19   THE COURT: One at a time.

04:44:30 20   Continue, counsel.

04:44:33 21   Q.   (By Mr. Re)   I just want it clear in the record what

04:44:35 22   Brandstein says.

04:44:37 23   Today we have affordable DSPs that allow us to

04:44:40 24   implement all but the most complex schemes cheaply in a

04:44:48 25   digital signal processing technology in real-time.

04:44:51	1	Do you see that?

04:44:51   2   A.   I do.

04:44:52   3   Q.   And does that suggest to one of ordinary skill in the

04:44:54   4   art to put various units of all kinds in a DSP?

04:44:58   5   A.   That's what the text teaches.

04:45:01   6   MR. RE: I'll pass the witness, Your Honor.   Thank

04:45:03   7   you.

04:45:03   8   THE COURT: Additional cross-examination?

04:45:06   9   MR. RUBINO: Yes, Your Honor.

04:45:06   10   RECROSS-EXAMINATION

04:45:18   11   BY MR. RUBINO:

04:45:18   12   Q.   Dr. Stern?

04:45:24   13   A.   Yes.

04:45:24   14   Q.   You didn't reference an Xbox in your analysis today,

04:45:29   15   did you?

04:45:29   16   A.   That was just a comment.

04:45:31   17   Q.   And that's not one of the references you combined?

04:45:34   18   A.   No.

04:45:34   19   Q.   You just made that up just now, right?

04:45:37   20   A.   I didn't make it up, but it's not part of the

04:45:39   21   testimony.   But it's -- it's not legally part of the

04:45:42   22   testimony.   It's not part of the report.

04:45:45   23   Q.   So the references that you did combine --

04:45:48   24   A.   Yes.

04:45:48   25   Q.   -- were only Brandstein, Li, Abutalebi --

04:45:53 1 A.   Dmochowski.

04:45:54 2 Q.   And Dmochowski, right?

04:45:55 3 A.   Correct, correct.

04:45:57 4 Q.   Those are the references -- that's the world of items

04:45:58 5 you're looking at for your motivation, right?

04:46:02 6 A.   That's correct.

04:46:02 7   MR. RUBINO: Pass the witness, Your Honor.

04:46:03 8   THE COURT: Further direct?

04:46:04 9   MR. RE: Nothing further, Your Honor. Thank you.

04:46:06 10   THE COURT: All right. Dr. Stern, you may step

04:46:08 11 down.

04:46:08 12   THE WITNESS: Thank you, Your Honor.

04:46:09 13   THE COURT: Mr. Re, does the Defendant desire this

04:46:18 14 witness to be excused?

04:46:19 15   MR. RE: Yes, we do, Your Honor.

04:46:21 16   THE COURT: Is there objection?

04:46:22 17   MR. RUBINO: No, Your Honor.

04:46:23 18   THE COURT: Dr. Stern, you are excused.

04:46:25 19   THE WITNESS: Thank you.

04:46:26 20   THE COURT: That means, sir, you're free to leave

04:46:28 21 us; you're free to stay. It's your call.

04:46:30 22   THE WITNESS: I'll stay for now.

04:46:32 23   THE COURT: All right. Defendant, call your next

04:46:33 24 witness.

04:46:34 25   MR. DACUS: Thank you, Your Honor. We call Dan

04:46:37 1 McGavock, and we have some binders to pass out, if we may

04:46:41 2 approach, Your Honor.

04:46:42 3   THE COURT: All right. Mr. McGavock, if you'll

04:46:47 4 come forward and be sworn.

04:47:01 5   (Witness sworn.)

04:47:01 6   THE COURT: Please come around, sir, have a seat

04:47:04 7 at the witness stand.

04:47:32 8   All right. Mr. Dacus, you may proceed.

04:47:34 9   MR. DACUS: Thank you, Your Honor.

04:47:34 10   DANIEL M. MCGAVOCK, DEFENDANTS' WITNESS, SWORN

04:47:34 11   DIRECT EXAMINATION

04:47:35 12 BY MR. DACUS:

04:47:35 13 Q. Mr. McGavock, would you introduce yourself to the jury,

04:47:41 14 please, sir?

04:47:43 15 A. Yes, my name is Dan McGavock. I'm from a suburb in

04:47:47 16 Chicago. I'm married. I've been married for 33 years. I

04:47:51 17 have a son and a daughter, ages 25 and 26.

04:47:54 18 Q. And where do you work, Mr. McGavock?

04:47:57 19 A. I work at an international consulting firm. It's

04:48:01 20 called Charles River Associates. And we specialize in

04:48:05 21 financial and economic analysis, and I'm the -- I run the

04:48:10 22 entire intellectual property practice for Charles River

04:48:15 23 Associates.

04:48:15 24 Q. And do you have a particular expertise, Mr. McGavock,

04:48:18 25 that brings you here to testify in this case?

04:48:20   1   A.   Yes.   I basically specialize in the valuation of

04:48:23   2   intellectual property rights in every context.   And so I do

04:48:28   3   it in litigation, such as cases like this where I'm trying

04:48:31   4   to determine a reasonable royalty, and I also determine the

04:48:36   5   value of patents in the context outside of litigation, for

04:48:40   6   example, helping companies license their technology.

04:48:42   7   THE COURT: Mr. McGavock, it's fine if you want to

04:48:44   8   turn toward the jury when you give some of your answers,

04:48:47   9   but you're turning away from the microphone.   However you

04:48:51   10 want to give your answers, just make sure that you're

04:48:54   11 heard, sir.

04:48:54   12   THE WITNESS: Thank you.

04:48:54   13   THE COURT: All right, counsel.   Continue.

04:48:58   14   MR. DACUS: Thank you, Your Honor.

04:48:59   15 Q.   (By Mr. Dacus)   Can you explain to the jury,

04:49:01   16 Mr. McGavock, what -- what it is your role is in this

04:49:05   17 particular case, what it is that you were asked to do?

04:49:07   18 A.   I was asked to assess the opinions of Mr. Ratliff, the

04:49:11   19 damages expert for Vocalife, and to comment on -- on his

04:49:19   20 analysis and opinions.

04:49:20   21   I was also asked to provide my own independent

04:49:23   22 opinion on what I deemed to be a reasonable royalty.

04:49:27   23 Q.   What if this jury finds that this patent is not used or

04:49:31   24 not infringed by Amazon, what are the damages?

04:49:35   25 A.   The damages would be zero.

04:49:36 1 Q. Okay. And what if this jury were to find that the '049

04:49:40 2 patent is, in fact, invalid, what would the damages be?

04:49:44 3 A. The damages would be zero.

04:49:46 4 Q. So, with all due respect to you and Mr. Ratliff, if the

04:49:52 5 jury finds either that the patent is invalid or that it's

04:49:54 6 not infringed, they could just disregard your testimony?

04:49:57 7 A. Yes.

04:49:58 8 Q. Can you explain to the jury, sir, what your educational

04:50:06 9 background is, please, sir?

04:50:07 10 A. Yes. I have a Bachelor of Science degree in accounting

04:50:12 11 from Indiana University. I'm also a certified public

04:50:17 12 accountant. I've been certified for over 35 years now.

04:50:20 13 And I'm also a certified licensing professional. It's kind

04:50:22 14 of a unique certification, and it recognizes my expertise

04:50:25 15 specifically in the licensing of intellectual property,

04:50:28 16 such as patent rights.

04:50:29 17 Q. And can you give the jury, sir, a high-level

04:50:33 18 description of what you've done in your professional life

04:50:36 19 outside of your -- your academic education background?

04:50:39 20 A. Yes. So I've been with Charles River Associates

04:50:45 21 effectively for 32 years. I've been consulting in

04:50:48 22 intellectual property for 35 years, but 32 of those have

04:50:51 23 been at Charles River Associates.

04:50:56 24   And we have 22 offices throughout the world,

04:50:58 25 including Dallas and College Station, Texas. And I run the

04:51:02   1   intellectual property practice, and we focus on determining

04:51:04   2   damages, valuing intellectual property rights, strategy,

04:51:08   3   and transactions.

04:51:09   4   I was also invited to teach a -- a graduate level

04:51:14   5   college course on the valuation of intellectual property

04:51:17   6   rights at Northwestern University.

04:51:19   7   And then very early in my career, before I got

04:51:22   8   into consulting, I was a staff auditor with the U.S.

04:51:26   9   Government -- Government Accountability Office. It's sort

04:51:29 10   of the FBI of accounting. What we did is evaluate fraud,

04:51:34 11   waste, and abuse in government programs. And I was a staff

04:51:36 12   auditor there.

04:51:37 13   Q.   Do you have any organizational affiliations that you

04:51:42 14   think are particularly relevant to the work that you're

04:51:44 15   doing in this case, Mr. McGavock?

04:51:47 16   A.   Yes. I've been recognized as a world -- a leading IP

04:51:55 17   strategist, as well as a leading economic expert in patent

04:51:59 18   litigation. So that's the first two designations there.

04:52:03 19   And both of those designations are based on nominations

04:52:06 20   from people in the industry that -- that know me or have

04:52:11 21   worked with me.

04:52:12 22   And the last point there is the Licensing

04:52:19 23   Executive Society. It's this very large professional group

04:52:22 24   that's dedicated to the licensing of intellectual property.

04:52:25 25   And I -- I've been a very active member since 1988, and I

04:52:29   1   was chairman of the valuation committee, which was focused

04:52:33   2   on teaching licensing -- licensing executives how to value

04:52:36   3   intellectual property rights when they're negotiating

04:52:38   4   patent licenses.

04:52:39   5   Q.   Give the jury, if you would, sir, some indication of

04:52:42   6   the number of assignments or engagements that you've had

04:52:46   7   related to valuing intellectual property and patent rights

04:52:50   8   over the course of your 35 years.

04:52:51   9   A.   It's been well over 500 assignments, and I would say

04:52:56   10   over 300 of those assignments specifically dealt with the

04:53:01   11   valuation of patent rights.

04:53:02   12   Q.   And can you give the jury some indication of the

04:53:07   13   companies, organizations, individuals that you've worked

04:53:11   14   for over the course of that 35 years?

04:53:12   15   A.   Yes.   I've worked with government agencies, I've worked

04:53:16   16   with high-tech companies, low-tech companies.   I've worked

04:53:21   17   with small companies, such as Vocalife, in valuing and

04:53:24   18   helping them develop commercialization plans.   So it's a

04:53:26   19   very wide -- wide variety of companies.

04:53:27   20   Q.   Have you testified in court before?

04:53:29   21   A.   Yes.

04:53:30   22   Q.   Many times?

04:53:31   23   A.   Yes, about 30 times.

04:53:33   24   Q.   Okay.   And do you have experience in negotiating

04:53:35   25   licenses outside of a -- of a lawsuit or litigation

04:53:39 1 context -- what I'll call the real world?

04:53:41 2 A.   Yes.   I've -- I've been -- that's a very important part

04:53:45 3 of my career.   Throughout my career, I've served as

04:53:49 4 financial advisors to parties in license negotiation.   And

04:53:51 5 I've also been the lead negotiator in a patent license

04:53:55 6 negotiation.

04:53:55 7 Q.   And is your firm being compensated or paid for the work

04:54:00 8 that you've done in this case, sir?

04:54:02 9 A.   Yes.

04:54:02 10 Q.   Is your payment in any way based on or contingent on

04:54:06 11 the outcome or result of this case?

04:54:08 12 A.   No.

04:54:10 13   MR. DACUS: At this time, Your Honor, I would

04:54:11 14 offer Mr. McGavock as an expert in accounting, economic

04:54:16 15 damages analysis, and the valuation of intellectual

04:54:18 16 property, including patents.

04:54:20 17   THE COURT: Is there objection?

04:54:21 18   MR. LAMBRIANAKOS: No objection, Your Honor.

04:54:23 19   THE COURT: Without objection, the Court will

04:54:24 20 recognize this witness as an expert in those designated

04:54:27 21 fields.

04:54:27 22   Please continue.

04:54:28 23   MR. DACUS: Thank you, Your Honor.

04:54:37 24 Q.   (By Mr. Dacus)   Now, before we dig into the work that

04:54:39 25 you did, Mr. McGavock, can you tell the jury the type of

04:54:41 1 information that you looked at, at a high level, in order

04:54:44 2 to perform your work in this case?

04:54:46 3 A.   Yes.   I reviewed the '049 patent.   I reviewed the

04:54:49 4 original '756 patent.   I reviewed thousands of documents,

04:54:52 5 business records that were produced primarily by Amazon, as

04:54:56 6 well as -- as Vocalife.   I reviewed deposition testimony.

04:54:59 7 We performed some independent research on certain issues,

04:55:02 8 which we'll talk about.   And then I also interviewed

04:55:07 9 several individuals at Amazon as we performed our work.

04:55:10 10 Q.   Have you been at the trial of this case each day?

04:55:13 11 A.   Yes.

04:55:14 12 Q.   At a high level, if you would, explain to the jury

04:55:21 13 from -- at least from your standpoint, what it is that you

04:55:24 14 and the jury are attempting to do in order to value or

04:55:28 15 determine a reasonable royalty if the jury should -- should

04:55:32 16 reach the damages part of this case?

04:55:33 17 A.   Okay.   Basically, what we're trying to do is -- is

04:55:39 18 isolate the value of the '049 patent and solely the '049

04:55:47 19 patent, and provide information that would be useful to the

04:55:50 20 negotiators in a hypothetical negotiation.   So I'm looking

04:55:53 21 for reliable indicators of value that they're directly tied

04:55:59 22 to the patented invention.

04:56:02 23 Q.   And I want to pause.   Is it important that you tie the

04:56:06 24 damages to the specific patented -- alleged patented

04:56:09 25 invention or feature?

04:56:10 1   A.   Yes, it's very important, especially in cases like this

04:56:13 2   when you have a multi-feature device and a very complex

04:56:19 3   ecosystem that goes along with that device.   So it's very

04:56:22 4   important to try to isolate the value associated with the

04:56:28 5   '049 patent.

04:56:28 6   Q.   Now, you were here yesterday for Mr. Ratliff's

04:56:31 7   testimony, and, of course, you knew before that about this

04:56:33 8   concept of DEV, downstream economic value, correct?

04:56:37 9   A.   Yes.

04:56:39 10 Q.   And can you tell us, at a high level -- or tell the

04:56:44 11 jury, at a high level, whether or not you think it is an

04:56:47 12 appropriate methodology for folks in the business you're --

04:56:50 13 that you're in and for what the jury is doing with respect

04:56:53 14 to valuing this patent to use this DEV as -- in the

04:57:01 15 calculation of damages?

04:57:03 16 A.   Yes, I do not think it's a reliable basis.   It comes

04:57:08 17 nowhere close to isolating the value of the '049 patent.

04:57:14 18 And DEV, by definition, the vast majority of value in DEV

04:57:23 19 is based on purchases that customers make through their

04:57:27 20 computer, through their smartphone, or tablets.   They're --

04:57:32 21 they're not voice purchases.   They're not using the

04:57:35 22 microphone array to make those purchases.   So that's --

04:57:37 23 that's one big problem.

04:57:38 24 Q.   Can -- can I -- can I pause you right there?   So what

04:57:45 25 we -- what you're showing on the screen here are computers

04:57:48   1   and tablets and phones, the purchases of which are included

04:57:53   2   in this DEV calculation; is that true?

04:57:55   3   A.   That's correct.   Purchases are made through those

04:57:57   4   devices.

04:57:58   5   Q.   And is it true that none of these devices are in --

04:58:03   6   accused of infringement in this case?

04:58:04   7   A.   That's correct.

04:58:06   8   Q.   Now, is there an additional problem with using this DEV

04:58:10   9   that Mr. Ratliff told the jury about yesterday?

04:58:13   10   A.   Yes.   The -- the actual profits -- I mean, I think

04:58:18   11   Mr. Ratliff called them derivative sales, but they -- they

04:58:20   12   relate to products that have nothing to do with the

04:58:24   13   patented invention, things like dog food, barbecue

04:58:29   14   utensils, fishing lures, et cetera.   So the -- the products

04:58:37   15   that represent the values in DEV are very far removed --

04:58:41   16   are not related to the patent at all.

04:58:43   17   Q.   And so that we're clear -- I mean, we could have put

04:58:45   18   any product on the right side of the screen.   These are --

04:58:48   19   these are just products that people can buy from

04:58:51   20   Amazon.com, correct?

04:58:51   21   A.   That's correct.

04:58:52   22   Q.   And, again, these are -- the DEV includes profits on

04:58:59   23   the sale of these products, none of which are accused of

04:59:02   24   infringement, correct?

04:59:02   25   A.   That's correct.   And I think there are -- I think there

04:59:05   1   are millions of products available on Amazon.com through

04:59:09   2   these devices. So you can purchase just about anything.

04:59:16   3   Q. So can you just explain to the jury, at a high level,

04:59:19   4   just -- just so we're all clear, as to whether or not you

04:59:21   5   think the DEV is an appropriate measure here? And, if not,

04:59:25   6   why not?

04:59:25   7   A. Again, it's -- it captures value for methods that are

04:59:33   8   unrelated to microphones. And the majority of the value is

04:59:36   9   associated with that. And it also relates to products that

04:59:40   10 are unrelated to the patent.

04:59:41   11   And the other thing I wanted to point out right

04:59:43   12 now is that DEV is, by definition, a forecast. It's --

04:59:48   13 it's not an actual profit number. And I'll go into more

04:59:52   14 detail on that as we go through the --

04:59:55   15 Q. And let's do that. Is it okay to start talking about

04:59:58   16 some of the details of this DEV calculation and -- and why

05:00:01   17 you think it is not a reliable starting point for the

05:00:05   18 valuation of a royalty in this case?

05:00:07   19 A. Yes. And I've got four topics here, so I'd like to

05:00:12   20 just go through each one individually.

05:00:13   21 Q. Okay.

05:00:13   22 A. So, first of all, based on the data available in this

05:00:17   23 case, I concluded that DEV estimates do not show any value

05:00:25   24 attributable to the '049 patent.

05:00:26   25 Q. And is there some evidence in this case to support that

05:00:29   1   conclusion?

05:00:29   2   A.   Yes.   We have a comparison of a product that doesn't

05:00:37   3   use the patent, so it's the Amazon Tap which has a

05:00:44   4   hands-free mode, so it doesn't have a microphone array.   It

05:00:47   5   has one microphone.   And I'm comparing that to the accused

05:00:51   6   Echo products which operate in hands-free mode with

05:00:51   7   microphone arrays.

05:00:52   8   So what I saw in the data that was relied upon by

05:00:56   9   Mr. Ratliff was the ability to compare the DEV for a

05:01:02   10 product that uses the patent, compared to products -- or a

05:01:06   11 product that does not use the patent.

05:01:10   12   MR. DACUS: Let me pause here.   Your Honor, under

05:01:12   13 the Court's procedures, I think we are about to get into

05:01:15   14 information that the parties have agreed the courtroom

05:01:17   15 should be sealed.   So I would ask that the Court please

05:01:20   16 seal the courtroom at this time.

05:01:21   17   THE COURT: All right.   Based on counsel's request

05:01:23   18 and pursuant to the Court's standing order on protecting

05:01:26   19 proprietary and confidential information, the Court will

05:01:29   20 order the courtroom sealed at this time.

05:01:32   21   And I'll direct that all persons present and not

05:01:37   22 subject to the protective order in this case excuse

05:01:41   23 themselves and remain outside the courtroom until the

05:01:43   24 courtroom is unsealed and reopened.

05:01:46   25   (Courtroom sealed.)

05:01:46   1   (This portion of the transcript is sealed

05:01:46   2   and filed under separate cover as

05:19:09   3   Sealed Portion No. 3.)

05:19:09   4   (Courtroom unsealed.)

05:19:09   5   THE COURT: This also unseals this remaining

05:19:11   6   portion of the record.

05:19:12   7   MR. DACUS: Thank you, Your Honor.

05:19:14   8   THE COURT: All right.   Counsel, you may continue.

05:19:25   9   MR. DACUS: Thank you, Your Honor.

05:19:25 10   Q.   (By Mr. Dacus)   So I interrupted you, Mr. McGavock, and

05:19:25 11   I apologize.   But you were telling us that one of the

05:19:26 12   things that Mr. Ratliff failed to do, in addition to the

05:19:27 13   things we've already talked about, is he failed to use the

05:19:30 14   operating profit to measure the downstream impact, correct?

05:19:34 15   A.   That's correct.   So --

05:19:35 16   Q.   So explain that to the jury what you're talking about.

05:19:37 17   A.   Well, he just left out other costs.   So his -- the DEV

05:19:41 18   is based on future projections of sales of all -- all those

05:19:45 19   types of goods, but he did not consider significant costs

05:19:48 20   associated with selling those goods.   The trucks, the

05:19:54 21   warehouses, the fulfillment centers, the cost of

05:19:58 22   maintaining the Amazon.com website.   So those are

05:20:01 23   completely left out of his calculation, despite the fact

05:20:05 24   he's projecting into the future.

05:20:06 25   Q.   Were you here yesterday -- do you remember Mr. Ratliff

05:20:10   1   saying that he used this thing called contribution profit?

05:20:14   2   Do you remember that?

05:20:19   3   A.   That's right.

05:20:20   4   Q.   And are you saying that contribution profit does not

05:20:23   5   include all of the expenses that he should have included

05:20:23   6   that Amazon incurs?

05:20:24   7   A.   That's correct.

05:20:24   8   Q.   Were you also here when Mr. Caruccio from Amazon

05:20:27   9   testified by video deposition?

05:20:32 10   A.   Yes.

05:20:33 11   Q.   Do you remember him giving that long list of expenses

05:20:35 12   that Amazon incurs?

05:20:36 13   A.   Yes.

05:20:36 14   Q.   And are those the expenses -- are you including all of

05:20:39 15   the list of the expenses that Mr. Caruccio identified?

05:20:41 16   A.   Yes, I'm trying to capture all of those.

05:20:45 17   Q.   And is it -- am I understanding you to say that

05:20:47 18   Mr. Ratliff did not include all of those expenses?

05:20:50 19   A.   That's correct. He did not go beyond the contribution

05:20:54 20   profit, which is a short-run variable profit, and doesn't

05:20:57 21   consider long-run operating cost.

05:21:00 22   Q.   And did you do a calculation -- if, in fact, you use

05:21:02 23   all the expenses or include them in the calculation that

05:21:05 24   you should, did you do a calculation to determine what

05:21:07 25   the -- the royalty rate should be?

05:21:10   1   A.   Yes.   If you account for those costs, the royalty rate

05:21:15   2   would be cut in half, so it would go from $1.32 to 66

05:21:22   3   cents.

05:21:22   4   Q.   Did you find any other evidence in the record that

05:21:24   5   Mr. Ratliff overstated his damages calculation?

05:21:27   6   A.   Yes.   He failed to adjust for multiple Echo devices in

05:21:35   7   a home.   So he does a per unit DEV calculation.   And if a

05:21:39   8   family buys two Echo units, he's -- he's assuming the DEV

05:21:44   9   value would just double for that household; that their

05:21:48 10   purchases would go up.   But Amazon does an adjustment.

05:21:51 11   Q.   Let me pause you there for a second.

05:21:54 12   MR. DACUS: Can -- Mr. Berk, can we pull up

05:21:57 13   DTX-81, please, sir, again?   And can you go to Page 7 and

05:22:07 14   Lines 233 through 237, please, sir?

05:22:11 15   Q.   (By Mr. Dacus)   Do you remember yesterday when I asked

05:22:18 16   Mr. Ratliff if he had accounted for this aggregation

05:22:21 17   factor?   Do you remember that?

05:22:22 18   A.   Yes.

05:22:22 19   Q.   And this document -- this is the same Exhibit 81 that

05:22:26 20   you relied on, and, candidly, he relied on also, correct?

05:22:30 21   A.   Correct.

05:22:30 22   Q.   And you -- do you remember that what Mr. Ratliff said

05:22:32 23   is his assumption was that this aggregation factor had

05:22:36 24   already been taken into account in the calculation of DEV?

05:22:41 25   Do you remember him saying that?

05:22:42   1   A.   Yes.

05:22:42   2   Q.   Is -- is that accurate in your mind -- in your opinion?

05:22:45   3   A.   No, it's inaccurate.

05:22:47   4   Q.   And tell the jury why.

05:22:48   5   A.   If it had been done, it would have been called ADEV,

05:22:56   6   A-D-E-V, adjusted DEV. That's the term they use. But I

05:22:59   7   read this document, and the first thing I asked the person

05:23:02   8   that prepared the very document Mr. Ratliff relied on is

05:23:04   9   did you -- does this document have an aggregated adjustment

05:23:09   10   in it, and it does not. So, Mr. Ratliff, again, is

05:23:11   11   mistaken.

05:23:12   12   Q.   Is that significant -- and I might point you to

05:23:15   13   Line 236 and what the result of failing to account for this

05:23:20   14   aggregation factor, whether or not it overstates or

05:23:24   15   understates DEV. Do you have any opinion on that?

05:23:27   16   A.   It overstates DEV if you do not make the aggregation

05:23:31   17   adjustment. It's basically double counting downstream

05:23:34   18   sales.

05:23:34   19   Q.   And did you --

05:23:36   20   MR. DACUS: If we can go back to the slides,

05:23:38   21   please, Mr. Berk.

05:23:39   22   Q.   (By Mr. Dacus) Did you actually sit down and do a

05:23:44   23   mathematical calculation of the effect of failing -- of

05:23:48   24   Mr. Ratliff's failure to include this aggregation factor in

05:23:52   25   his calculation?

05:23:53   1   A.   Yes.

05:23:53   2   Q.   And -- and what did that show you?

05:23:55   3   A.   It adjusts his royalty rate by -- it reduces it by 35

05:24:00   4   percent.   That's the aggregation factor used by Amazon.

05:24:03   5   It's a 35 percent downward adjustment.   So his $1.32

05:24:09   6   royalty rate goes down to 86 cents per unit.

05:24:11   7   Q.   And what -- what if we were to make both of those

05:24:16   8   adjustments, the operating profit adjustment and the

05:24:18   9   adjustment for the failure to include this aggregation

05:24:21   10   factor, what -- what would the resulting royalty rate be?

05:24:23   11   A.   43 cents per unit.

05:24:28   12   Q.   And -- and what we're doing here, we're using --

05:24:31   13   although you disagree with the use of DEV, what you've done

05:24:33   14   in -- in this calculation is assumed that DEV is

05:24:38   15   appropriate.   But under that assumption, even if it was a

05:24:45   16   correct methodology, Mr. Ratliff needed to correctly use

05:24:48   17   DEV, and he did not?

05:24:50   18   A.   That's correct.   And this is -- this is separate from

05:24:52   19   the other issue of not deducting the losses on the devices.

05:24:55   20   These are just other issues.

05:24:58   21   Q.   Okay.   Did you find other evidence -- and what -- what

05:25:00   22   I might do before we talk about this one --

05:25:03   23   MR. DACUS: Mr. Berk, can you pull up Slide 31

05:25:06   24   from Mr. Ratliff's presentation, please, sir?

05:25:09   25   Q.   (By Mr. Dacus)   Do you recognize this as what

05:25:21   1   Mr. Ratliff showed the jury yesterday, Mr. McGavock?

05:25:23   2   A.   Yes.

05:25:23   3   Q.   Do you see there that 6.7 percent related to device

05:25:28   4   contribution apportionment Echo sales channel?

05:25:32   5   A.   Yes.

05:25:32   6   Q.   Do you agree with that methodology or number that

05:25:38   7   Mr. Ratliff used?

05:25:41   8   A.   I -- I don't understand the logic, and I don't agree

05:25:45   9   with the way he calculated it.

05:25:47   10   Q.   Before we talk about the details of the calculation, I

05:25:50   11   want you to give the jury some sense, as someone who's done

05:25:55   12   this for 35 years, whether or not you've ever seen

05:25:59   13   anyone -- and I mean, ever anyone in your area of expertise

05:26:04   14   use an advertising expense in this manner for

05:26:10   15   apportionment?

05:26:10   16   A.   I have never seen anything like this in my entire

05:26:13   17   career. First of all, he's assuming that there are no

05:26:16   18   marketing expenses for the Echo devices, which is -- which

05:26:19   19   is wrong. But then what he's doing is he's saying that the

05:26:21   20   other marketing expenses, the 6.7 percent, is completely

05:26:26   21   unrelated to the Echo device. But he's using that to

05:26:29   22   allocate value to the device. And if you're going to use

05:26:36   23   that kind of a cost-based adjustment, sort of a cost

05:26:40   24   allocation, there's a better way to do it.

05:26:43   25   Q.   And did -- if we were to assume his methodology was

05:26:47   1 correct and use it, did you go through the steps to

05:26:51   2 correctly assess what -- what portion of advertising

05:26:55   3 expense should be included in the calculation?

05:26:57   4 A.   Well, I did an alternative calculation where I looked

05:27:01   5 to determine the contribution of the Echo device compared

05:27:05   6 to other things that he talked about, such as fulfillment

05:27:09   7 cost and everything else. I looked at the -- the actual

05:27:13   8 expenses incurred on the Echo device, as compared to

05:27:18   9 overall expenses, and I came up with a different

05:27:21   10 apportionment factor.

05:27:21   11 Q.   And if you include the apportionment factor based on

05:27:26   12 the expenses you described, what would the adjusted royalty

05:27:30   13 rate be?

05:27:30   14 A.   So his apportionment factor would go from 6.7 percent

05:27:34   15 down to .9 percent. And so if you applied the .9 percent

05:27:41   16 in -- in his calculation, his royalty rate would go from

05:27:46   17 $1.32 to 18 cents per unit.

05:27:48   18 Q.   And then, finally, do you remember that 40 to 50

05:27:51   19 percent technical apportionment that Mr. Ratliff had on his

05:27:55   20 pyramid chart? Do you agree with -- with that technical

05:28:00   21 apportionment?

05:28:00   22 A.   No, he simply applied a 50 percent apportionment

05:28:06   23 factor -- actually, I think in this one, it's the 40

05:28:09   24 percent. And in my expert report, I discuss a much more

05:28:14   25 structured and rigorous apportionment approach that was

05:28:17 1 provided by Dr. Kiaei.

05:28:19 2 Q. Did you hear Dr. Kiaei testify about the actual

05:28:23 3 apportionment that he believes is more appropriate for this

05:28:26 4 microphone array as it relates to the Echo and the Alexa

05:28:30 5 devices?

05:28:31 6 A. Yes, I was very -- I -- I studied what he had done in

05:28:34 7 his expert report. So I'm very familiar with the structure

05:28:37 8 he used, and it's very similar to what I've done in the

05:28:40 9 past.

05:28:43 10 Q. Okay. This hypothetical negotiation that Mr. Ratliff

05:28:48 11 explained yesterday, do you agree that's the proper

05:28:50 12 construct or structure through which the jury should view

05:28:55 13 their determination of a reasonable royalty?

05:28:57 14 A. Yes.

05:28:58 15 Q. And, basically, that means you've got Amazon at one

05:29:02 16 side of the table and Vocalife at the other side of the

05:29:07 17 table negotiating a valid -- a reasonable value for a

05:29:12 18 royalty on this patent, correct?

05:29:14 19 A. That's right.

05:29:14 20 Q. And like Mr. Ratliff, do you agree that there are

05:29:17 21 several factors that the law and the Court requires you to

05:29:20 22 look at?

05:29:21 23 A. Yes.

05:29:21 24 Q. And did you do that in this case?

05:29:23 25 A. Yes, they're called the Georgia-Pacific factors. I

05:29:26   1   considered all of the factors, and I have some differences

05:29:32   2   of opinion with Mr. Ratliff on those.

05:29:34   3   Q.   And, in looking at those factors, is there one in

05:29:38   4   particular that is of significance that you believe the

05:29:41   5   jury should take into account in this case? And, if so,

05:29:46   6   what is it?

05:29:46   7   A.   Well, there's -- there's a few of the factors that

05:29:49   8   relate to what others have paid for similar intellectual

05:29:57   9   property rights. Georgia-Pacific 15, the very last factor,

05:30:01 10   specifically says what amount a patent owner would be

05:30:06 11   willing to accept. And so I looked for evidence in the

05:30:10 12   record of what Dr. Li would be willing to accept.

05:30:16 13   Q.   Is this a little bit like house shop -- have you ever

05:30:21 14   bought a house, Mr. McGavock?

05:30:22 15   A.   Yes.

05:30:23 16   Q.   So when you buy a house, do you look to see if that

05:30:23 17   particular house has ever sold, or sold in the recent past,

05:30:24 18   and do you also look at other houses in the neighborhood to

05:30:27 19   see what they sell for?

05:30:29 20   A.   That's right. In the valuation world, we call it the

05:30:32 21   market approach. You're looking at comparable transactions

05:30:35 22   or comparable indications of value.

05:30:37 23   Q.   Is that one of the things that you understand the

05:30:40 24   Georgia-Pacific factors require you to do?

05:30:41 25   A.   Yes. I think several of the -- at least three of the

05:30:44   1   factors touch on that concept.

05:30:45   2   Q.   Is there evidence in this case of what Vocalife, for

05:30:50   3   example, or Dr. Li would have accepted for the technology

05:30:52   4   that's at issue in this case?

05:30:53   5   A.   Yes.   He offered to sell the original '756 patent to

05:30:59   6   Google for $700,00000.

05:31:04   7   MR. DACUS: And, Your Honor, may I have leave to

05:31:06   8   grab a board?

05:31:06   9   THE COURT: You may.

05:31:09   10   MR. DACUS: Thank you, Your Honor.

05:31:32   11 Q.   (By Mr. Dacus)   And so tell the jury, if you would,

05:31:33   12 Mr. McGavock, why you think it's significant as to Dr. Li

05:31:39   13 offering to sell this '756 patent to Google for $700,000.00

05:31:42   14 with respect to the calculation of royalties in this case?

05:31:45   15 A.   Well, it's -- it covers a similar property, a similar

05:31:52   16 patent.   It involves Dr. Li, the patent owner, and so it

05:31:57   17 provides a very strong indication of what Dr. Li would

05:31:59   18 accept for selling or licensing the rights to his

05:32:09   19 invention.

05:32:09   20 Q.   And so we heard some testimony earlier in the case

05:32:12   21 about the fact that the '756 patent is very different from

05:32:16   22 the '049.   Were you here for that testimony?

05:32:18   23 A.   Yes.

05:32:18   24 Q.   And so that is a consideration here, right, because

05:32:21   25 what was offering to be sold is the '756, correct?

05:32:24   1   A.   Correct.   So when you're -- when you're comparing

05:32:27   2   properties, like comparing different houses, you want to

05:32:30   3   make sure they have -- you know, they're in the same

05:32:34   4   neighborhood, the same number of rooms.   So I did compare,

05:32:37   5   I did look at the two patents.

05:32:39   6   Q.   And so what I -- what I put up here, sir, is this is

05:32:42   7   the Claim 1 of the '049 patent; do you understand that?

05:32:45   8   A.   Yes.

05:32:46   9   Q.   And you understand from your work in this case that the

05:32:49   10 only difference between the '049 Claim and the '756 are

05:32:55   11 these words that are italicized; is that fair?

05:32:59   12   THE COURT: Just a minute.

05:33:01   13   MR. LAMBRIANAKOS: Objection, Your Honor.   This

05:33:03   14 discussion is beyond the scope of his report.

05:33:04   15   THE COURT: Do you have a response, counsel?

05:33:06   16   MR. DACUS: Certainly this particular board was

05:33:12   17 not in his report, Your Honor, but the comparison of the

05:33:16   18 '756 and the '049 and the comparability with respect to the

05:33:22   19 Google offer were.

05:33:23   20   THE COURT: Well, I can't imagine a damages expert

05:33:26   21 who would have the claim language in their report.

05:33:29   22   MR. DACUS: I do agree with that, Your Honor.   I

05:33:30   23 do not dispute that, that the claim language was not in

05:33:32   24 there.

05:33:33   25   THE COURT: Well, by the same token, I would

05:33:37   1   assume that the offer or evidence that's been brought

05:33:46   2   forward about Google would relate to the patent-in-suit and

05:33:50   3   its predecessor. If you'll -- if you'll address that topic

05:33:54   4   in a manner outside of the claim language itself --

05:33:58   5   MR. DACUS: I'd be happy to do that.

05:34:00   6   THE COURT: -- I think that probably will resolve

05:34:04   7   the problem.

05:34:04   8   MR. DACUS: I'll be happy to do that.

05:34:06   9   THE COURT: Why don't you rephrase without that

05:34:08   10   board up.

05:34:08   11   MR. DACUS: I'll be happy to do it.

05:34:10   12   THE COURT: And then, counsel, if you still

05:34:11   13   believe it's objectionable, reurge your objection at that

05:34:15   14   time.

05:34:15   15   Q.   (By Mr. Dacus) So Mr. McGavock, for purposes of what

05:34:15   16   we're doing here, of determining whether or not this offer

05:34:17   17   is something that the jury should consider as significant

05:34:19   18   evidence of the value of the '049, do you consider that a

05:34:22   19   comparable or similar technology, just like you would in

05:34:29   20   house shopping and looking at a comparable or similar

05:34:32   21   house?

05:34:32   22   A.   Yes --

05:34:32   23   Q.   And tell the jury why.

05:34:34   24   A.   -- as well as in valuing patents.

05:34:38   25   The '756 patent is the original invention. The

05:34:41   1   '049 is a re -- a reissue patent of that invention, so

05:34:46   2   there's substantial overlap. And they're almost identical.

05:34:51   3   I read both patents. And I actually looked very closely at

05:34:54   4   how Dr. Li thought of his technology in terms of market

05:34:59   5   applications.

05:35:01   6   At that time, in both patents, he viewed the

05:35:06   7   invention as relating to smartphones, tablets, and other

05:35:12   8   devices, much -- a much bigger potential market than just

05:35:19   9   smart speakers.

05:35:19   10 Q.   And have you seen any evidence in this case that at the

05:35:22   11 time Dr. Li offered to sell the patent to Google for

05:35:30   12 $700,000.00, that he actually at least claims that he

05:35:32   13 believed Amazon was infringing?

05:35:33   14 A.   Yeah, he was -- I listened to his testimony in the

05:35:37   15 courtroom, I read his deposition, so I understand that he

05:35:40   16 was aware at that time that he felt Amazon had launched a

05:35:45   17 product that was infringing.

05:35:50   18 Q.   So even with allegedly the subjective thought that

05:35:54   19 Dr. Li says he had, that he thought Amazon was infringing

05:35:56   20 before the offer to Google, he was still willing to sell

05:35:59   21 his patent for $700,000.00; is that correct?

05:36:02   22 A.   That's correct.

05:36:02   23 Q.   And is that a piece of evidence you think the jury

05:36:05   24 should consider in their determination of value of this

05:36:07   25 patent if they should get that far?

05:36:09   1   A.   Yes, I think that's highly relevant. Google was a

05:36:13   2   major technology company at the time. Dr. Li, both at the

05:36:16   3   time -- at that time, as well as of the '049 reissue, felt

05:36:22   4   that both inventions covered a very broad market. And so I

05:36:26   5   think, in my view, from a valuation expert standpoint, this

05:36:29   6   is a very strong indication of value.

05:36:34   7   Q.   You know, sir, that a -- a license -- or a royalty can

05:36:40   8   be paid in two different forms, correct?

05:36:43   9   A.   Generally speaking, yes. There are probably more than

05:36:46 10   that.

05:36:46 11   Q.   And -- and what are the two forms?

05:36:49 12   A.   It could be a lump sum royalty or a running royalty,

05:36:53 13   which is a -- a rate applied to some unit of measure, like

05:36:58 14   device sales.

05:36:58 15   Q.   And if the Court in this case asks this jury to ask a

05:37:02 16   question about whether or not their award is based on a

05:37:06 17   lump sum or a running royalty, have you seen evidence in

05:37:09 18   this case as to what these two parties would have likely

05:37:13 19   negotiated?

05:37:13 20   A.   Yes. I think there would be, based on my review of the

05:37:18 21   record, sort of an agreement -- or an agreement on this

05:37:23 22   issue. Dr. Li had already offered to sell the invention

05:37:29 23   for a lump sum amount of $700,000.00. And then we heard

05:37:35 24   Amazon has a policy of -- a general policy of negotiating

05:37:39 25   lump sum agreements.

05:37:40	1	Q. You were here when Scott Hayden from Amazon testified
05:37:43	2	by video deposition, were you?
05:37:46	3	A. Yes.
05:37:46	4	Q. And is this his trial -- trial testimony by video
05:37:52	5	deposition that he gave, that we have on the screen,
05:37:55	6	related to the policy?
05:37:56	7	A. That's correct. He said the expectation of the policy
05:37:58	8	is to do a one-time, lump sum fixed payment.
05:38:02	9	Q. In addition to that, Amazon has produced other licenses
05:38:06	10	that it has entered into with other companies in this case,
05:38:10	11	correct?
05:38:10	12	A. That's correct.
05:38:10	13	Q. And did you review those?
05:38:11	14	A. Yes, I reviewed all of those licenses.
05:38:13	15	Q. And about how many were there?
05:38:15	16	A. I think between 10 and 12, something like that.
05:38:19	17	Q. And can you give the jury some indication as to whether
05:38:21	18	or not those licenses were, in fact, lump sums?
05:38:25	19	A. The vast majority were lump sums. There was only one
05:38:30	20	agreement that would be a true or pure running royalty
05:38:34	21	agreement.
05:38:34	22	Q. So the evidence related to this lump sum versus running
05:38:38	23	royalty is Dr. Li offered a lump sum payment, correct, to
05:38:44	24	Google?
05:38:45	25	A. Yes.

05:38:45   1   Q.   Amazon's policy is to have a lump sum, correct?

05:38:48   2   A.   Yes.

05:38:48   3   Q.   And indeed the Amazon licenses that have been produced,

05:38:52   4   with the exception of one, which is a running royalty, the

05:38:55   5   rest of them either have a cap and/or a lump sum, correct?

05:38:59   6   A.   That's correct. And the one that was a running

05:39:01   7   royalty, that was for an entire portfolio of patents that

05:39:05   8   related to a standard -- the MPEG standard for playing

05:39:12   9   music.

05:39:13   10   Q.   I'd like to in the last few minutes, Mr. McGavock, to

05:39:16   11   put some numbers, if you would, to this reasonable royalty

05:39:20   12   calculation that you did using the actual sales numbers

05:39:25   13   from the Echo. Can you walk us through that, please, sir?

05:39:27   14   A.   Yes. So I rely upon -- I don't remember the exhibit

05:39:33   15   number, but there was a document --

05:39:35   16   Q.   It is DTX-418; does that sound correct?

05:39:39   17   A.   That sounds familiar.

05:39:41   18   Q.   Now, go ahead, I apologize.

05:39:43   19   A.   And I -- I added up all of the revenues for actual

05:39:50   20   voice purchases during that time period. I projected for

05:39:52   21   earlier years, as well, and brought the numbers forward.

05:39:55   22   So I cover I think a six -- about a six-year

05:39:58   23   period, a little over a six-year period of actual voice

05:40:04   24   purchases. I applied Amazon's operating margins to those

05:40:09   25   voice purchase revenues, to come up with an average

05:40:10 1 operating profit per unit of 12 -- roughly 13 cents.

05:40:19 2 Q. And did you also utilize the technical apportionment.

05:40:24 3 As opposed to the 40 or 50 percent that Mr. Ratliff used,

05:40:25 4 did you use -- utilize the technical apportionment that you

05:40:30 5 believe is more appropriate?

05:40:31 6 A. That's correct.

05:40:31 7 Q. And did you come to a royalty per unit based on those

05:40:34 8 numbers?

05:40:35 9 A. That's correct. So if you multiply the roughly 13

05:40:38 10 cents by the five and a half cents, you get the result

05:40:41 11 there, which is .0071 per device.

05:40:45 12 Q. And since that was per device, do you need to know the

05:40:48 13 accused units, that is the number of Echos that were sold,

05:40:52 14 in order to calculate the royalty?

05:40:55 15 A. Yes.

05:40:56 16 Q. And what's that number?

05:40:57 17 A. It's 18,947,013 units.

05:41:01 18 Q. And that would result in a royalty of what?

05:41:03 19 A. 134,524.

05:41:07 20 Q. So --

05:41:08 21 A. And I should point out, my number -- my number of units

05:41:11 22 is a little lower than Mr. Ratliff's. His is roughly

05:41:15 23 19 million because he made an error in his projection. He

05:41:20 24 actually includes non-accused sales in his projection.

05:41:23 25 Q. Can you give the jury what your final conclusions are,

05:41:26   1   sir, to the extent they reach the damages question, what

05:41:29   2   you think a reasonable royalty would be in this case?

05:41:32   3   A.   Yes.   I think a reasonable royalty would be no more

05:41:37   4   than $700,000.00, and I think somewhere in this range would

05:41:40   5   be reasonable.

05:41:41   6   I think the -- the data points that I have used so

05:41:44   7   that the Google offer and the actual voice purchase data

05:41:48   8   provide the most reliable and credible way to value the

05:41:56   9   '049 invention separately from everything else.

05:41:58   10 Q.   And the 134,000, that's derived from using the actual

05:42:04   11 purchases made through the Echo device?

05:42:06   12 A.   That's correct.

05:42:07   13 Q.   And would -- is it your opinion that this should be

05:42:11   14 awarded as a running royalty or as a lump sum?

05:42:13   15 A.   I think a lump sum would be appropriate, based on the

05:42:16   16 evidence in the case.

05:42:18   17   MR. DACUS: That's all I have, Your Honor.   I pass

05:42:19   18 the witness.

05:42:20   19   THE COURT: All right.   Ladies and gentlemen,

05:42:22   20 we're going to take advantage of this opportunity to recess

05:42:26   21 for the day.   We're not going to start the

05:42:28   22 cross-examination this late in the afternoon.   We'll begin

05:42:31   23 in the morning with the Plaintiff's cross-examination of

05:42:35   24 Mr. McGavock.

05:42:37   25   As you prepare to leave the courthouse, if you

05:42:39   1   will make sure you take your juror notebooks to the jury

05:42:42   2   room and leave them closed on the jury room table

05:42:46   3   overnight.

05:42:46   4   Please travel safely to your homes. I'd like you

05:42:49   5   back, as you were this morning, and I want to compliment

05:42:53   6   you on being timely. I'd like you back so that we can

05:42:57   7   begin as close to 8:30 as possible. So if you'll be

05:43:01   8   assembled in the jury room before 8:30. Please travel

05:43:04   9   safely to your homes.

05:43:05   10   Please remember all the instructions I've given

05:43:07   11   you, including not to discuss this case or anything about

05:43:10   12   it with anyone, including yourselves.

05:43:13   13   With that, ladies and gentlemen of the jury,

05:43:17   14   you're excused until tomorrow morning.

05:43:21   15   COURT SECURITY OFFICER: All rise.

05:43:26   16   (Jury out.)

05:43:27   17   THE COURT: Be seated, please.

05:43:44   18   Mr. McGavock, you can step down.

05:43:47   19   THE WITNESS: Thank you.

05:43:49   20   THE COURT: Counsel, for your information,

05:43:51   21   according to the Court's records, Plaintiff has 1 hour and

05:43:57   22   25 minutes remaining. Defendant has 1 hour and 36 minutes

05:44:00   23   remaining.

05:44:01   24   I've received your jointly submitted and updated

05:44:06   25   final jury instructions and verdict. I'll be going over

05:44:09   1   that.

05:44:11   2   It's my intention to finish the evidence some time

05:44:17   3   around noon tomorrow. And after an appropriate lunch

05:44:22   4   break, it's my intention to, having sent the jury home,

05:44:27   5   take up motions either party would care to offer under

05:44:33   6   Rule 50(a).

05:44:33   7   Having heard arguments and ruled on those, I would

05:44:36   8   then next to propose to conduct an informal charge

05:44:41   9   conference in chambers to review the recently-updated and

05:44:45   10 jointly submitted proposed final jury instructions and

05:44:50   11 verdict form.

05:44:51   12   And having a fulsome discussion with parties

05:44:53   13 and -- counsel, rather, in an informal and robust setting,

05:44:58   14 I'll take all of that input into account and generate what

05:45:02   15 I believe to be the appropriate final jury instruction and

05:45:06   16 verdict form for submission to the jury. I'll provide you

05:45:08   17 with copies to review and consider.

05:45:11   18   And then I'll conduct a formal charge conference

05:45:13   19 on the record where either party may offer such objections

05:45:17   20 to that document or those documents as they believe the

05:45:22   21 interest of their clients require.

05:45:23   22   Those of you that will be presenting closing

05:45:28   23 arguments, you are not required to be present tomorrow

05:45:31   24 afternoon while these matters are taken up. You may use

05:45:34   25 that time to prepare for your closing arguments. You're

05:45:38   1   certainly welcome, if you choose to participate, but

05:45:40   2   there's no shortage of lawyers on either side of this case.

05:45:43   3   So, as long as these other matters are adequately

05:45:46   4   staffed, those of you that will present closing arguments

05:45:48   5   are not required to be here.

05:45:52   6   Particularly with regard to the informal charge

05:45:54   7   conference, I would invite all counsel who are present to

05:45:58   8   be present and participate in that. There's quite a few

05:46:03   9   lawyers that have warmed a bench most of this trial and not

05:46:06   10   had an opportunity to participate. And their input,

05:46:10   11   suggestions, and arguments are more than welcome to be

05:46:12   12   included in that informal charge conference.

05:46:15   13   With regard to motion practice under Rule 50(a),

05:46:18   14   if you want to file something for me to consider in

05:46:21   15   writing, you need to file it before tomorrow morning.

05:46:24   16   I do not intend this to be a lengthy process where

05:46:30   17   I hear long, drawn-out arguments. I want to identify the

05:46:36   18   issues that will be addressed in the parties' motions.

05:46:40   19   It's common that there are diametrically opposed

05:46:44   20   motions under Rule 50(a) for such topics as infringement

05:46:47   21   versus non-infringement. And I'll, in all likelihood, hear

05:46:51   22   those competing arguments concurrently.

05:46:55   23   But it's my intention to -- to get to the heart of

05:46:59   24   the matter, hear the arguments, references to the

05:47:01   25   applicable evidence, which I have heard throughout the

05:47:03 1   trial, and then I can give you a ruling.

05:47:07 2   If you want to present more of a briefing format

05:47:10 3   rather than a concise oral argument, put it in writing and

05:47:14 4   file it overnight.

05:47:17 5   Are there questions from either party at this

05:47:18 6   juncture before we recess for the evening?

05:47:22 7   MS. TRUELOVE: Just to be clear, Your Honor,

05:47:24 8   your -- your intention is to have the informal charge

05:47:27 9   conference. And then the Court will provide us with its

05:47:29 10   charge tomorrow afternoon, and then we will come back and

05:47:32 11   put objections on the record tomorrow?

05:47:34 12   THE COURT: I intend to finish the formal charge

05:47:37 13   conference tomorrow so that Thursday morning we can begin

05:47:41 14   with the jury and my final instructions, your closing

05:47:44 15   arguments, and then they can retire and deliberate on the

05:47:47 16   verdict.

05:47:48 17   So counsel that will be presenting closing

05:47:51 18   arguments do not need to worry about being prepared to go

05:47:56 19   forward with those on Wednesday. It will be first thing

05:48:00 20   Thursday morning.

05:48:00 21   MS. TRUELOVE: That's all I have, Your Honor.

05:48:02 22   THE COURT: Do -- do the parties know at this

05:48:04 23   juncture who is going to be presenting their closing

05:48:06 24   arguments?

05:48:08 25   MS. TRUELOVE: I believe we do, yes, Your Honor.

05:48:10 1 Mr. Fabricant.

05:48:12 2   THE COURT: All right.

05:48:13 3   MR. FABRICANT: Yes, Your Honor, I will for the

05:48:14 4 Plaintiff, Your Honor.

05:48:15 5   THE COURT: First and second Plaintiff's argument?

05:48:17 6   MR. FABRICANT: Yes, Your Honor.

05:48:17 7   THE COURT: Mr. Dacus, do the Defendants have --

05:48:20 8 have they made that decision?

05:48:21 9   MR. DACUS: I don't know definitively, but likely

05:48:24 10 Mr. Hadden and I will split it, Your Honor.

05:48:27 11   THE COURT: All right.

05:48:27 12   MR. DACUS: And, Your Honor, I do have a question

05:48:29 13 with respect to 50(a), if I could.

05:48:29 14   THE COURT: Yes.

05:48:31 15   MR. DACUS: The Court said file something by

05:48:32 16 morning. I'm a little concerned about that because --

05:48:35 17   THE COURT: Midnight tonight.

05:48:37 18   MR. DACUS: By midnight tonight? Even -- even

05:48:37 19 without the evidence being closed, you would like our 50(a)

05:48:42 20 motions? My question was, can we wait --

05:48:44 21   THE COURT: I'm not going to stop and have a

05:48:47 22 multi-hour delay after the rebuttal case closes before I

05:48:50 23 take up the 50(a) motions.

05:48:52 24   MR. DACUS: Understood completely, Your Honor. So

05:48:54 25 my question was -- and, obviously, the Court can say no --

05:48:57 1   is can we file it as soon as evidence closes --

05:49:00 2   THE COURT: Well, if you want me to have an

05:49:01 3   opportunity to read it -- what I'm trying to do is to avoid

05:49:04 4   a delay in the process. You're usually the one that asks

05:49:07 5   for the right to file something in writing, Mr. Dacus.

05:49:10 6   You've done that before. I'm trying to accommodate your

05:49:13 7   preferences, but I'm not going to delay the process.

05:49:17 8   Otherwise, I'll just simply say, give me a concise oral

05:49:21 9   argument from the podium, and we'll let that suffice.

05:49:24 10   MR. DACUS: How about if we file something before

05:49:26 11 midnight tonight, Your Honor; will that work?

05:49:28 12   THE COURT: If you file it before midnight, I'll

05:49:31 13 have an opportunity to look at it.

05:49:33 14   MR. DACUS: Thank you very much for that

05:49:34 15 opportunity.

05:49:34 16   MR. HADDEN: Thank you.

05:49:34 17   THE COURT: Anything from anybody else?

05:49:37 18   MS. TRUELOVE: No, Your Honor.

05:49:38 19   THE COURT: If not, we stand in recess until

05:49:41 20 tomorrow morning.

05:49:42 21   COURT SECURITY OFFICER: All rise.

          22   (Recess.)

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1   CERTIFICATION

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3   I HEREBY CERTIFY that the foregoing is a true and

4   correct transcript from the stenographic notes of the

5   proceedings in the above-entitled matter to the best of my

6   ability.

7

8

9   /S/ Shelly Holmes_____   10/6/2020
       SHELLY HOLMES, CSR, TCRR   Date
10   OFFICIAL REPORTER
      State of Texas No.: 7804
11   Expiration Date: 12/31/2020

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